

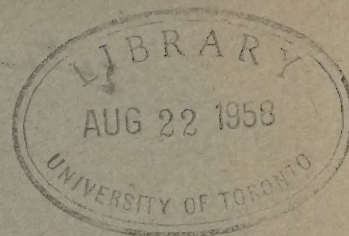
CA29N
Z1
-22 H101
142

Ontario Hydro-Electric
Inquiry Commission

142

1922-1924
COPY FOR MR. J. ALLAN ROSS


Engineering data



HYDRO-ELECTRIC POWER COMMISSION
OF ONTARIO

COPY OF
REPORT ON
EXCAVATION METHODS AND EQUIPMENT

TRANSCRIBED MAY, 1923



Digitized by the Internet Archive
in 2024 with funding from
University of Toronto

<https://archive.org/details/31761118922178>

INDEX TO EXCAVATION METHODS AND EQUIPMENT

Subject	Page
Calumet Sag Canal. Sec. 5, Green Bros. Contractors	1 - 11
Sec. 11, J. O. Heyworth, Contractors	11, 12, 33 - 37
Sec. 13, A. Guthrie & Co. Contractors	12 - 26
Sec. 12, Byrne Bros. Contractors	26 - 33
Sec. 9, Byrne Bros. Contractors	38
Summary	39
Sullivan Machinery Co., Compressors	40
This document is on Jack Hammers	40
Bit Sharpeners	40
excavation methods and equipment submitted to Mr. H. G. Acres on June 28th, 1918, by Mr. J. H. Goodwin	41
Goodman Electric Locomotive Works	41
Illinois Steel Co., Gantry Crane & Grab Bucket	41 - 44
connection with the proposed Kingston-Chippewa Power Development. The original illustrations have been copied with the aid of the camera.	
Zin-Ho Portable Compressors	44
Bucyrus Company, Electric Shovels	44 - 62
The original copy was handed to me by Mr. Acres on May 10th, 1923, at "Marion" Shovel Co., Electric Shovels, and	
Jeffrey Mfg. Co., Electric Locomotives	62 - 68
United States Government Channel Work, Detroit River	69 - 73
Lidgerwood Dragline Cableway Levee Work	73 - 79
Method Chicago Drainage Canal	80
Jeffrey Manufacturing Company, Rock Conveyors	80, 81
Toronto, May 21st, 1923.	
Allis Chalmers Plant	81
Chain Belt Company, Rock Conveyor	81
Wood-Nordberg Co., 12' Screw Pumps	81, 82
Lidgerwood Company, General	82
Canada Crushed Stone Company (Well Drills)	83 - 87

INDEX TO EXCAVATION METHODS AND EQUIPMENT

Page	Subject
87 - 88	Canada Crushed Stone Company (Well Drills)
88	Lidgerwood Company, General
81, 82	Wood-Worthing Co., Inc., Sump Pumps
81	Chain Belt Company, Hook Conveyor
81	Allis Chalmers Plant
80, 81	Jeffrey Manufacturing Company, Hook Conveyors
80	Method Chicago Drainage Canal
79 - 79	Lidgerwood Dragline Cableway Levee Work
69 - 73	United States Government Channel Work, Detroit River
68 - 68	Jeffrey Mfg. Co., Electric Locomotives
68 - 68	"Marion" Shovel Co., Electric Shovels, and
68 - 68	Engstrom Company, Electric Shovels
44	Kin-No Portable Compressors
44 - 44	Illinois Steel Co., Gentry Crane & Hoist
41	Goodman Electric Locomotive Works
40	Hit Shapemans
40	Jack Hammer
40	Sullivan Machinery Co., Compressors
39	Summary
38	Sec. 8, Byrne Bros. Compressors
38 - 38	Sec. 12, Byrne Bros. Compressors
38 - 38	Sec. 13, A. Guthrie & Co. Compressors
38 - 38	Sec. 11, J. O. Hayward, Compressors
37 - 37	Sec. 5, Green Bros. Compressors

Toronto, June 22nd, 1916.

Mr. J. Allan Ross:

REPORT ON EXCAVATION METHODS AND EQUIPMENT

Prefatory Note

By Mr. J. B. Goodwin

REPORT ON EXCAVATION METHODS AND EQUIPMENT

This document is an exact transcription of the text of a report on excavation methods and equipment submitted to Mr. W. G. Acres on June 26th, 1916, by Mr. J. B. Goodwin covering a trip of inspection made by him in connection with the proposed Queenston-Chippewa Power Development. The original illustrations have been copied with the aid of the camera.

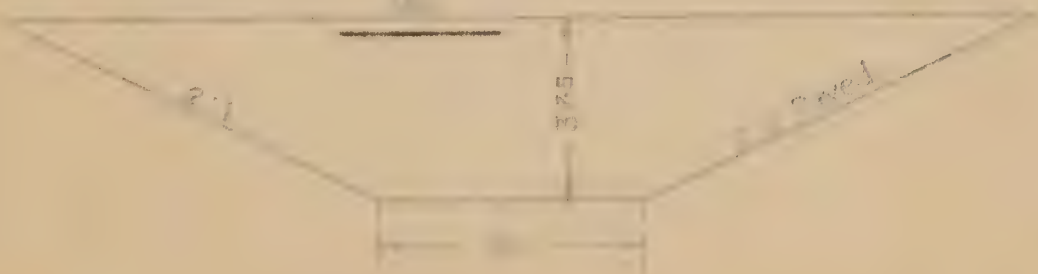
The original copy was handed to me by Mr. Acres on May 10th, 1923, at my request, and has since been returned to him.

These sketches are working on the

Walter J. Francis

Consulting Engineer.

nature and dimensions of the section,
Toronto, May 21st, 1923.



COPY

1895 (1896) as an exact transcription of the text on a report on

the subject of the report, and was submitted to Mr. W. B. Jones on June 1895.

It is of Mr. J. F. Farmer's report of inspection made by him in

connection with the report on the subject of the report, and

was submitted to Mr. W. B. Jones with the aid of the camera.

The report was made by Mr. J. F. Farmer on May 1895, at

the request of Mr. W. B. Jones, and was submitted to him

W. B. Jones

Printed by J. F. Farmer, 1895.

Toronto, June 26th, 1916.

MEMO. TO MR. ACRES:

EXCAVATION METHODS AND EQUIPMENT

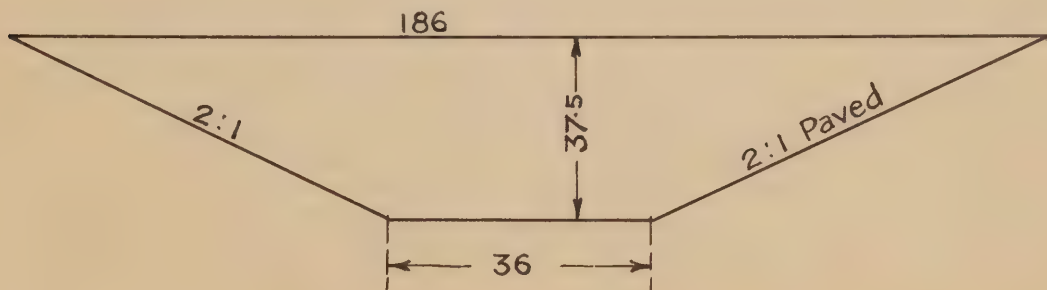
CALUMET SAG CANAL

SECTION 5. GREEN BROS.

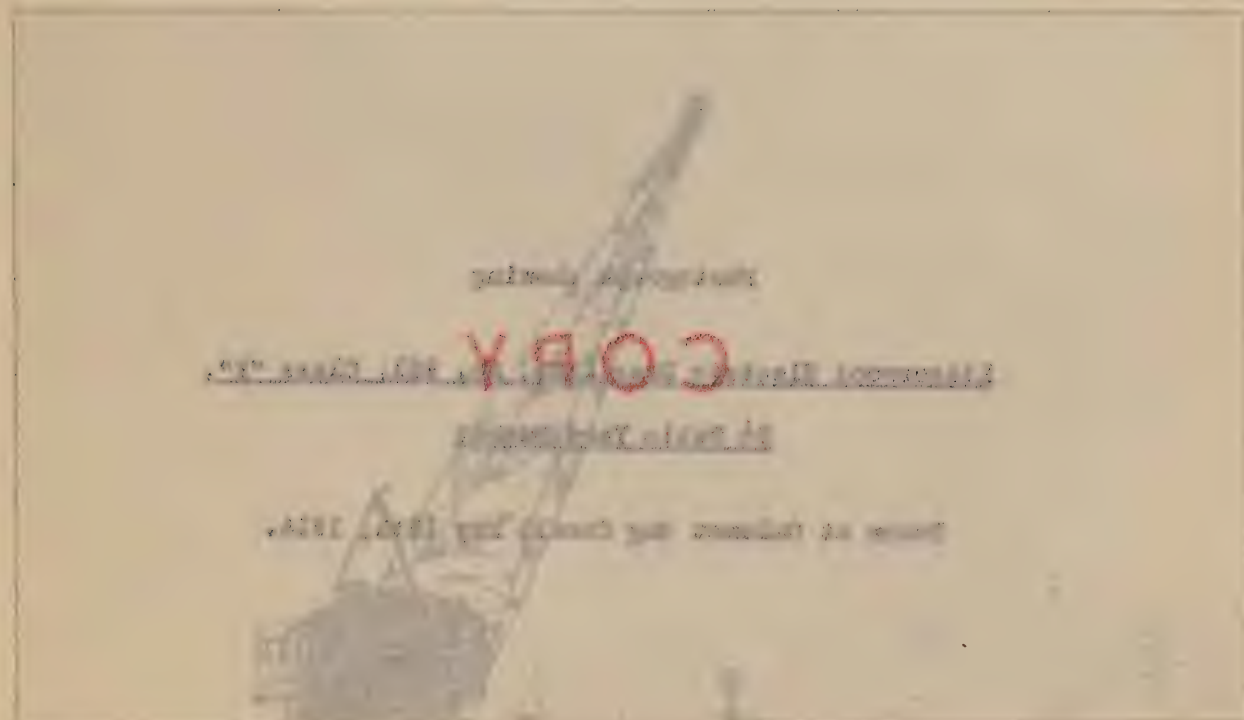
I submit herewith memo. covering results of visits to the Calumet Sag Canal at Chicago and other points in United States, with special reference to excavation methods and equipment which would be suitable for our work on the Niagara Power Development.

On Thursday, May 18th, accompanied by Messrs. Dryer and Crawford of the Lidgerwood-Crawford Co., and Mr. Hogg, an inspection was made of two Lidgerwood-Crawford Electric Drag Excavators, No. 951, Class K.

These machines are working on the Calumet Sag Canal on Section 5, which is contracted to Green & Sons, of Chicago. The accompanying sketch shows the nature and dimensions of the section.



COPY



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 2.

Photograph showing

Lidgerwood Electric Drag Line, No. 951, Class "K",

2½ Cubic Yard Bucket

Taken at Calumet Sag Canal, May 18th, 1916.



FRANK J. FRANK & COMPANY

PRINTING AND LITHOGRAPHING

100 N. 1st St. - St. Louis

ST. LOUIS, MO.
COPY

RECEIVED BY THE ST. LOUIS POST-DEMOCRAT

AT THE CITY OF ST. LOUIS

THIS IS TO CERTIFY THAT THE ABOVE IS A TRUE COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face Page No. 3.

Photograph showing

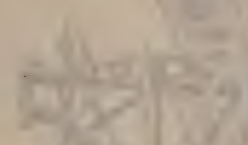
COPY

Lidgerwood Electric Drag Line, No. 961, Class "K".

2½ Cubic Yard Bucket

Taken at Calumet Sag Canal, May 18th, 1916.





COPY

THE NATIONAL GEOGRAPHIC MAGAZINE

VOLUME 11, NUMBER 1, JANUARY, 1911

Published by the NATIONAL GEOGRAPHIC SOCIETY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face Page No. 4.

Photographs showing

COPY

Two Electrically-driven Class "B" Lidenwood Drag Line Excavators

Equipped with 100-foot Booms and 2½-cubic yard Buckets

Taken at Calumet Sag Channel, Chicago.





1. Room and 2 1/2 cubic yard bucket, operating on
the ground level. These excavators consist of glacial drift, boulders and blocks
of rock. The capacity of the excavators is from sixteen hundred to twenty-five hundred cubic yards per ten hours.

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face Page No. 5.

Photograph showing

Electrically-driven Class "X" Listerwood Drag Line Excavator

Equipped with 100-foot Boom and $2\frac{1}{2}$ -cubic yard Bucket

Taken at Calumet Sag Channel, Chicago.



Electrically driven Class "K" Lidgerwood Drag Line Excavator equipped with 100-foot Boom and 2½-cubic yard Bucket, operating on Section 5 of Calumet Sag Canal near Chicago. The material encountered by these excavators consists of glacial drift, boulders and blasted rock. The capacity of the two excavators in this hard digging averaged from sixteen hundred to twenty-five hundred yards in ten hours.

COPY FOR ENCLOSURE TO MR. J. ALAN
TO THE DIRECTOR



COPY

ENCLOSURE TO MR. J. ALAN

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 6.

Photograph showing

COPY

Canal Section and Rip-rap Lining, Calumet Sag Canal

Taken May 18th, 1916.



WALTER J. PETERS & COMPANY
COPYRIGHTED BY W. J. PETERS 1947
IN THE YEAR 2047



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 7.

Photograph showing

COPY

Finished Canal Section, Calumet Sag Canal

Taken May 16th, 1916.



At the point where these two machines were operating, there was about 4 ft. of limestone above grade and the sides were paved from the rock up. The paving material is dumped from time to time on the slope ahead of the pavers. This materially reduced the rate of excavation.

The rock is blasted to suit average steam shovel requirements.

Machines were operated with 100 ft. booms and have a working radius of 106'; the bucket is a Page 2½ cu. yd. capacity.

OPERATION OF DRAG LINES:

The main motor is a C.G.E. 112 h.p., operated by 60-cycle, three-phase alternating current at 440 volts which is supplied by the Public Service Corporation. The swing motor is a 52 h.p., and the compressor motor a 3½ h.p., using the same current. The main feeder is alternating current, 60-cycle, three-phase, 2300 volt, leading to portable transformers which are moved along on a truck with the excavators.

The operation of the machine is very simple. Two electric controllers and three air controllers are located within close reach of the operator, who is seated in full view of the digging. The motors are protected against overload by automatic current control.

ROCK EXCAVATION.

Drill holes are spaced about 6 ft. centre to centre, and at this point were 9 ft. deep, being drilled 5 ft. below grade. 7 pounds of 60% dynamite were placed in each hole and the blasting was done without "springing". This is about 1-3/10 lbs. of dynamite per cubic yard actually excavated. This amount of dynamite would be less if the depth of the rock were greater.

It is the object of the present invention to provide a means of controlling the operation of the machine at intervals when the machine is not in operation. The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation. The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation.

The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation. The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation. The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation.

DESCRIPTION OF THE INVENTION

The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation. The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation. The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation.

The operation of the machine is controlled by a means of controlling the operation of the machine at intervals when the machine is not in operation. The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation. The machine is provided with a means of controlling the operation of the machine at intervals when the machine is not in operation.

CLAIMS

1. A machine provided with a means of controlling the operation of the machine at intervals when the machine is not in operation. 2. A machine provided with a means of controlling the operation of the machine at intervals when the machine is not in operation. 3. A machine provided with a means of controlling the operation of the machine at intervals when the machine is not in operation.



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 9.

Photograph showing

COPY

Nature of Wet Excavation, Calumet Sag Canal.



PROBABLE COST.

The following is a statement of the approximate cost of excavation:

Fixed Charges.

Interest 5% on cost of two Drag Lines (\$50,000), distributed over 250 days per year	\$ 10.00 per day
Depreciation 5% ditto.	10.00 " "
Repairs 10%, working two shifts	20.00 " "
Administration, including superintendent, two time-keepers, one electrician and Head Office charges	30.00 " "
Interest, Depreciation and Repairs on two Wagon Drills, 25% of \$2000, distributed over 250 days	2.00 " "
Ditto.- on one 6" Centrifugal Pump and Boiler, 25% on \$500.00, distributed over 250 days	1.50 " "
Ditto.- on one Temporary Building, 50% of \$1000 distributed over 250 days	2.00 " "
TOTAL FIXED CHARGES	\$ 74.50 " "
Coal for Pump and Drills, 3 tons at \$2.50	7.50
Oil, Waste, etc.	1.00
Electric Energy for two Drag Lines	17.00

Labor.

28 Pavers - \$2.50	70.00 per day
1 Foreman	3.50
Drillers, Powdermen and Helpers, 10 men at 30¢	30.00
Foreman	4.00
2 Pumpmen at 30¢ per hour	6.00
Drag Line Operators, 2 men at \$175 per month	14.00

— 200 —

bioRxiv preprint doi: <https://doi.org/10.1101/140200>; this version posted May 11, 2017. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

• 852767 • 80217

Interest of at least two lines (\$50,000).

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

Depreciation by 10.00 "

* 1988 1988

Administrative, including expenditure, two times

100-443887-100

COPY

03.

[illegible]

021... ***** HVAL 001 TOWN DERBYSHIRE

* * 08-07 [REDACTED] 08/06/2007

[illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	5
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---

[illegible]

1921

Ind-709 0000 04.18 = amount \$1

.....

[illegible]

Labor - Continued:

2 Oilers, \$75 per month \$ 5.00 per day

4 Trackmen, 25¢ per hr. 10.00 " "

Blacksmith and Helper, 65¢ per hr. 6.50 " "

Preparatory Charges 4.00 " "

Powder and Fuses 125.00 " "

TOTAL \$ 378.00

Add 15% 56.70

TOTAL \$ 434.70

Deduct paving labor - \$73.50

Portion of overhead - 22.50

15% of the same - - 14.00 110.00

BALANCE \$ 324.70

Output - 500 cu. yds. at 64¢ per cu. yd.

Contract prices for rock excavation - 70¢ per cu. yd.

Glacial drift - 24¢ per cu. yd.

Rip-rap paving - \$1.00 per sq. yd.

SECTION 11. - J. O. HEYWORTH, CONTRACTOR.

On the same day had a consultation with the Engineers of the Bucyrus Co., South Milwaukee, regarding Electric Drag Line Excavators and Shovels. Arrangements were made with Messrs. Beck and Ruhloff, to visit the Heyworth contract on the Calumet Sag Canal, where there is a Bucyrus Electric Drag Line Excavator in operation. Information regarding the current consumption and road curves

was promised and appears later.

There were no Electric Shovels or Excavators in process of assembly at the plant on the day of our visit.

SECTION 13. - A. GUTHRIE & CO.

On May 20th, Mr. Hogg and the writer called on Mr. O'Rourke of the Sullivan Machinery Co., of Chicago, and discussed rock excavation by Gantry and Grab Buckets, and also by Conveyor and Shovels. Blue Prints Nos. B-10-2-1-L, and B-10-2-3-L, were left with Mr. O'Rourke, who has promised to give us his suggestions in connection with these propositions.

With Mr. O'Rourke, we visited various contracts on the Calumet Sag Canal work. The first was Section No. 13, under contract to A. Guthrie & Co. where a Model No. 300 "Marion" Revolving Shovel was operating in an earth cut.

The Shovel is steam driven and makes a cut approximately 75' wide at the bottom and 130' wide at the top, of a 40' cut, using an 8 cu. yd. dipper, loading into cars approximately at the natural surface of the ground. Shovel track was on rock and required only two trackmen to move and lay the track, which is largely done by the shovel.

At the time of our visit the shovel was handling about 5000 cu.yds. in 10 hrs., although the dumps were not in good shape, being only 10 to 15 ft. high, which necessitated frequent track shifting.

The train service consisted of two trains of six or seven 20 cu. yd. air dump Kilbourne & Jacobs cars, handled by engines of apparently 40 to 50 tons



COPY

THE UNIVERSITY OF CHICAGO PRESS

CHICAGO, ILL. 60607

1987

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 13.

Photograph showing

COPY

Model No. 303 Marion Steam Shovel, with 8 Cubic Yard Bucket

Loading into 20 Cubic Yard K. & J. Air Dump Car

Taken at Calumet Sag Canal, May 20th, 1916.





COPY

THE UNIVERSITY OF CHICAGO

LIBRARY

1900

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 14.

Photograph showing

COPY

Model No. 300 Marion Steam Shovel, with 8 Cubic Yard Bucket

Loading into 20 Cubic Yard K. & J. Air Dump Car

Taken at Calumet Sag Canal, May 20th, 1916.





WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 15.

Photograph showing

COPY

Truck of Marion Steam Shovel, Model 300

Taken at Calumet Sag Canal, May 20th, 1916.





COPY

REPRODUCED FROM THE

U.S. GOVERNMENT PRINTING OFFICE

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 16.

Photograph showing

COPY

Size of Boom of Marion Steam Shovel, Model 300

Taken at Calumet Sag Canal, May 20th, 1916.





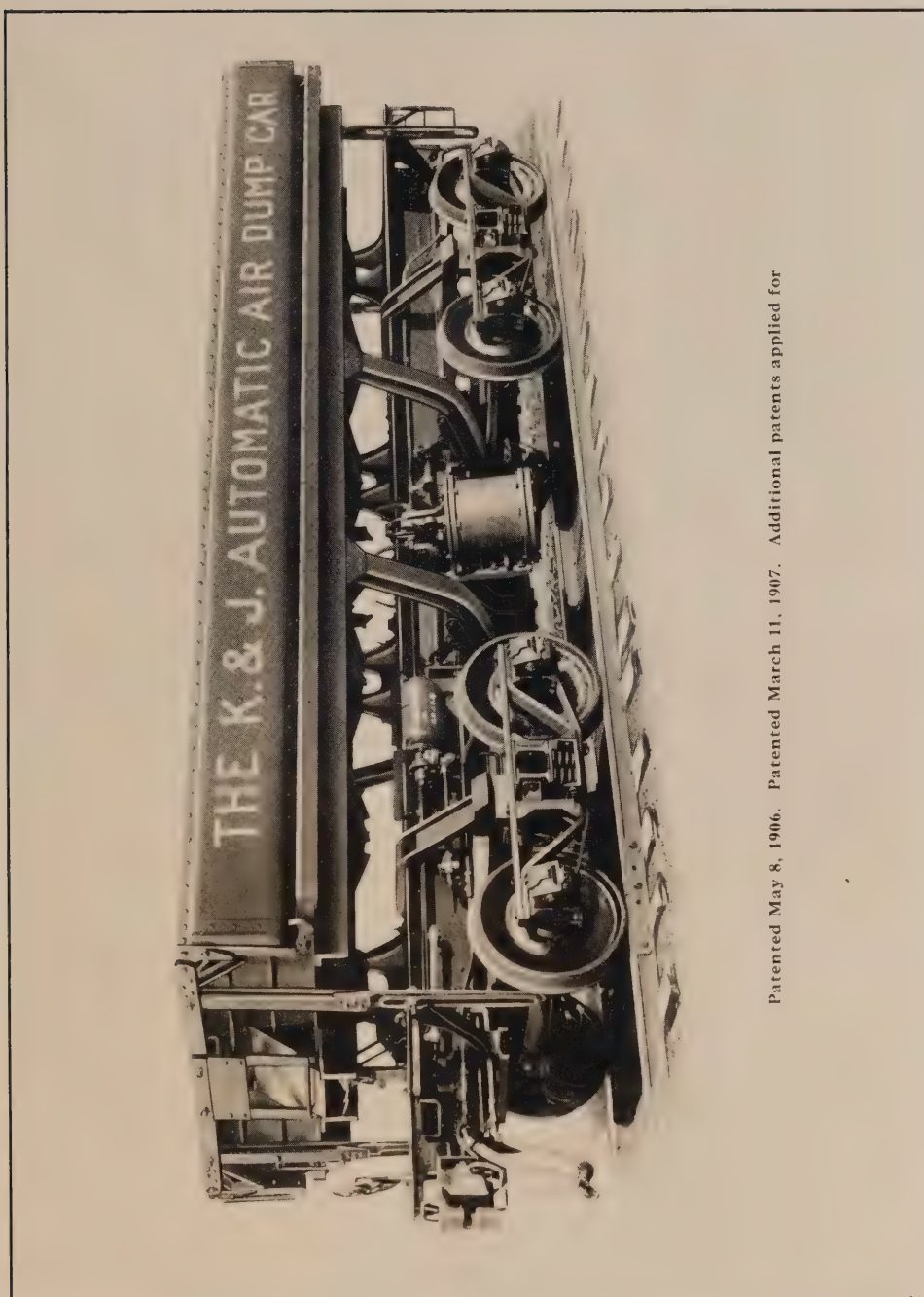
WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 17.

Photograph showing

COPY

"K. & J." Automatic Air Dump Car



Patented May 8, 1906. Patented March 11, 1907. Additional patents applied for

COPY FOR ENCLOSURE TO Mr. J. J. Hill, Wash. D. C.

... ..

COPIES

1944/1945: 1. April 1944, 1. April 1945, 1. April 1946

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 18.

Photograph showing

COPY

Eucyrus Shovel No. 225-B

Stripping Coal Land Near Liberal, Mo.





WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 19.

Photograph showing

COPY

Eucyrus Shovel No. 70-C Loading Skip which is Handled by

Class 175-B Electric Drag Line

Calumet Sag Channel.



WALTER J. GIBSON & COMPANY
COPY FOR EXHIBIT TO S. J. ALLEN ROSS.
To face page 10, 11.



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 20.

Photograph showing

COPY

Butler Bros. #225B "Moose" at Work in

Mace #2 Mine, Washburn, Minn.



in weight. Size of the rail was about 70 lbs. per yard.

See Photo. of Kilbourne & Jacobs Mfg. Company's cars. (Page 17).

Also see Photos. and data on Bucyrus Shovel 225B. which show several conditions of high lift. (Continued on page 23).

UNITED STATES RECLAMATION SERVICE.

MINIDOKA PROJECT, IDAHO.

COMPARATIVE COSTS ON EXCAVATION.

Electric Dredges 754 & 755.

Sept. 2, 1913 to Nov. 30, 1914.

Dredge No. 754 Dredge No. 755

COPY

	Total Cost	Unit	Total Cost	Unit
Labor, Excavation	6,778.17	.0162	7,729.74	.0153
Electricity, cost of	343.58	.0008	431.87	.0008
Repairs, labor	461.93	.0011	981.62	.0019
" materials	1,209.62	.0029	2,201.43	.0044
Steel Rope	588.58	.0014	556.65	.0011
Transmission line at 6 1/2 ft.	3,271.26	.0079	3,255.78	.0065
Miscellaneous supplies	933.15	.0022	1,072.48	.0021
Depr. on machinery	6,335.17	.0151	6,836.48	.0136
TOTAL FIELD COST	19,921.46	.0476	23,065.85	.0457
Eng'r. and admin. 15%	2,988.22	.0072	3,459.88	.0069
GRAND TOTAL COST	22,909.68	.0548	26,525.73	.0526

Gross section yardage	417,942	504,306
Yardage actually moved	485,963	581,986
K.W. of electricity used	188,730	237,330
Number of shifts worked	719	916
Av. gross section c.y. per shift	581.3	550.6
Av. actual c.y. per digging hour	104.5	104.7
K.W. electricity per c.y. moved	.39	.41

MACHINE EFFICIENCY.

Hours spent in	hours		hours	
Digging	4,650.0	80.8%	5,559.0	75.9%
Power shut off	108.5	1.9%	145.1	2.0%
Changing power cable	67.6	1.2%	83.1	1.1%
Repairing lights	5.2	.1%	11.9	.2%

MACHINE EFFICIENCY - Continued.

Hours spent in	hours		hours	
Repairing machinery	399.2	6.9%	749.1	10.2%
Repairing caterpillars	56.2	1.0%	84.1	1.1%
Moving Dredge	166.8	3.3%	354.6	4.8%
Miscellaneous delay	278.5	4.8%	342.1	4.7%
TOTALS	5,752.0	100%	7,328.0	100%

Remarks.-

This report compares the total excavation costs of Bucyrus electric draglines Nos. 754 and 755, to completion of drainage work on this project. In general the machines ran three eight-hour shifts per day for six days per week. One shift, or part of one shift Sundays spent in general repairs.

Dragline No. 754 completed D-12, D-12D, D-14 and D-15 drains, while No. 755 completed D-5, D-5A, D-15 Outlet, D-15G, and D-16.

Costs include all charges from the time the machines were set up until drainage was completed. Electricity charges based on actual operation, maintenance and annual cost, depreciation of power plant and transmission lines. Machine depreciation covers difference between actual cost and selling price of machines.

P.M. Cronholm, (Signed)
Supt. of Construction.

F.C. Bohlson, (Signed) .
Costkeeper.

COMPARISON OF ELECTRIC SHOVELS IN SWEDEN.

	<u>GERMAN</u>		<u>BUCYRUS-100C</u>	
Maximum Peak	390 KW	380 KW	520 KW	480 KW
Next 4 Peaks	370 "	340 "	460 "	420 "
Amount of Excavation	36.5 T	36.5 T	37.4 T	36 T
Average Load	105.4 KW	105.4 KW	157 KW	164 KW
Time to Load 5 Cars	20 Min	22 Min	9½ Min	11½ Min
KWH	35.1	38.6	24.8	30.8
KWH per Ton	0.96	1.06	0.662	0.855

The above shows that although the peaks for the Bucyrus shovels are higher

1221

REVENUE - 1931			
1931	1930	1929	1928
Operating revenue	2,782.0	2,782.0	2,782.0
Operating expenses	1,000.0	1,000.0	1,000.0
Operating income	1,782.0	1,782.0	1,782.0
Interest expense	1,000.0	1,000.0	1,000.0
Income before taxes	7,382.0	7,382.0	7,382.0
Taxes	1,000.0	1,000.0	1,000.0
Net income	6,382.0	6,382.0	6,382.0

Continued

This report compares the 1931 operating results of the company with the 1930 and 1929 results. The 1931 operating results show a significant increase in revenue and a decrease in expenses, resulting in a higher net income. The 1930 results show a similar trend, with revenue and net income being higher than in 1929. The 1929 results show a decrease in revenue and net income compared to the previous two years. The company's operating results are generally strong, and the management is confident in the company's ability to continue to grow and improve its performance in the future.

COPY

W. J. Frank & Company
 1221

1221

REVENUE - 1931			
1931	1930	1929	1928
Maximum Peak	2,782.0	2,782.0	2,782.0
Next 4 Peaks	2,782.0	2,782.0	2,782.0
Next 8 Peaks	2,782.0	2,782.0	2,782.0
Next 12 Peaks	2,782.0	2,782.0	2,782.0
Next 16 Peaks	2,782.0	2,782.0	2,782.0
Next 20 Peaks	2,782.0	2,782.0	2,782.0
Next 24 Peaks	2,782.0	2,782.0	2,782.0
Next 28 Peaks	2,782.0	2,782.0	2,782.0
Next 32 Peaks	2,782.0	2,782.0	2,782.0
Next 36 Peaks	2,782.0	2,782.0	2,782.0
Next 40 Peaks	2,782.0	2,782.0	2,782.0
Next 44 Peaks	2,782.0	2,782.0	2,782.0
Next 48 Peaks	2,782.0	2,782.0	2,782.0
Next 52 Peaks	2,782.0	2,782.0	2,782.0
Next 56 Peaks	2,782.0	2,782.0	2,782.0
Next 60 Peaks	2,782.0	2,782.0	2,782.0
Next 64 Peaks	2,782.0	2,782.0	2,782.0
Next 68 Peaks	2,782.0	2,782.0	2,782.0
Next 72 Peaks	2,782.0	2,782.0	2,782.0
Next 76 Peaks	2,782.0	2,782.0	2,782.0
Next 80 Peaks	2,782.0	2,782.0	2,782.0
Next 84 Peaks	2,782.0	2,782.0	2,782.0
Next 88 Peaks	2,782.0	2,782.0	2,782.0
Next 92 Peaks	2,782.0	2,782.0	2,782.0
Next 96 Peaks	2,782.0	2,782.0	2,782.0
Next 100 Peaks	2,782.0	2,782.0	2,782.0

The above shows that although the peak of the company's operations are higher

and the average load is higher, the time taken to load a train of five cars is less than half of the time taken by the German shovels. Therefore, the KWH per ton for the Bucyrus shovels is less than for the German shovels.

It is also to be noted that one Bucyrus shovel is doing the equivalent of two German shovels in the same time and for less current.

1 Foreman

30¢ per hour.

W. PLENN

(Continued from page 21)

On the dump, a third engine of the same weight, operated a Jordan Spreader. These two trains could not keep the shovel working more than 75% of the time, although the dump was less than half a mile away. A conservative estimate with good train service would be 4000 cu. yds. per day of 10 hours. The labor employed was about as follows:

COPY

Steam Shovel.

1 Operator at \$ 175.00 per month.

1 Crane man " 90.00 " "

1 Fireman " 75.00 " "

2 Trackmen at 25¢ per hour.

Train Service.

2 Engine men estimated 45¢ per hour.

2 Firemen 30¢ " "

2 Trackmen 25¢ " "

Dump.

1 Engineer 45¢ per hour.

(1 Fireman 30¢ or \$12.00 per hour.

1 Brakeman 25¢ per hour.

and approximately 25 men at 25¢ per hour.

1 Foreman 35¢ per hour.

Trestle Gang.

6 Carpenters at 40¢ per hour.

1 Foreman " 60¢ per hour.

Administration and Office.

1 Superintendent estimated \$350.00 per month.

2 Timekeepers 100.00 " "

1 Storekeeper 100.00 " "

Head Office expenses 250.00 " "

General.

1 Blacksmith .45¢ per hr.

1 Helper .25¢ " "

Miscellaneous 1.00 " "

PROBABLE COST:

The following would be a close approximation of the cost of excavation:

Interest 5% on \$25,000 (steam shovel) for 250 dys. Per Day. \$ 5.00

Depreciation 5% ditto. 5.00

Repairs 10% ditto. 10.00

1 Engineer 48¢ per hour.

1 Woman 50¢ per hour.

1 Woman 45¢ per hour.

and approximately 10 men in 1950 and 1951.

1 Woman 45¢ per hour.

Traveling

1 Carpenter at 45¢ per hour.

1 Woman 45¢ per hour.

Administrative and Office

1 Supervisor 100.00

1 Stenographer 100.00

1 Stenographer 100.00

1 Stenographer 100.00

Summary

1 Stenographer 100.00

1 Helper 100.00

1 Stenographer 100.00

Summary (Cont)

The following table is a close approximation of the cost of construction:

Interest at 5% on \$25,000 (approx. amount) for 1950 and 1951 \$ 1.00

Depreciation at 10% 8.00

Reserve for 10% 12.00

Interest, Depreciation & Repairs on three locomotives, and 20 dump cars. \$70,000 at 25%, distributed over 250 days. \$ 75.00

Interest & Depreciation on 3 miles of track, (except ties) 20% on \$12,000, distributed over 250 days. 10.00

Interest & Depreciation on ties, 125% of \$3200, distributed over 250 days. 16.00

Interest & Depreciation on temporary buildings 50% of \$1000, distributed over 250 days. 2.00

Interest, Depreciation & Repairs, on Pumps, etc. 25% of \$1000 for 250 days. 1.00

Superintendence and Office at \$900 per month. 36.00

TOTAL FIXED CHARGES \$160.00 per day.

Labor.

Steam Shovel Operation - 2 Shifts.

2 Operators at \$175.00 per month	14.00 per day.
2 Crane men 90.00 " "	7.00 " "
2 Firemen 75.00 " "	6.00 " "
4 Trackmen .25¢ per hour	10.00 " "

Train Service - 2 Shifts.

3 crews at \$10.00 per day	120.00 " "
----------------------------	------------

Dump - 2 Shifts.

25 Laborers at 25¢ per hour	125.00 " "
Foreman	7.00 " "

Trestle Gang - 1 Shift.

6 Carpenters at 40¢ per hour	24.00 " "
1 Foreman at 50¢ per hour	5.00 " "

World's Largest Electric Shovel Strips Overburden from Coal

Miscellaneous.

At Smithfield, Co. the Piney Fork Coal Company strip the overburden from their 211 "Marion" Revolving Shovel, operated by electric power from Wheeling, West Va., a sixth mile away. 1st Shift Coal, water, oil, waste, &c., for 2 shifts for shovel and three locomotives, \$30.00 per day. Blacksmith and Helper - 1 shift 7.00 " "

The economy and certainty of power resulting have permitted uninterrupted operation through the coldest weather. TOTAL \$515.00

Two electrical companies for 2 and 4000 ft. cable and 2 miles of the splendid satisfaction given by the 6 yard shovel. These shovels are operated by one man and are safe and reliable. Add 15% 77.20 TOTAL COST \$592.20

Output for Two Shifts.

4000 cu.yds. for the day shift.

3000 cu.yds. for the night shift TOTAL 7000 cu. yds. -

Costing \$592.00 8¢ per yard

Add for trestle material 8¢ " "

TOTAL 16½¢ " "

Contract price 22¢ ?

SECTION 12. - BYRNE BROS.

The next section visited was No. 12, under contract to Byrne Bros. Here one Model 211 "Marion" Revolving Shovel (steam), was loading blasted rock into two 6 cu. yds. cars, which were taken in turn up a two-track incline, tippie dumping the spoil about 100 ft. from the canal.

This shovel was equipped with a 2 cu. yd. bucket and worked between the vertical channel sides of canal 60 ft. wide, on a bench of about 16 ft. deep (before blasting). The tippie appears to have sufficient capacity to

World's Largest Electric Shovel Strips Overburden from Coal

At Smithfield, O. the Piney Fork Coal Company strip the overburden from their coal with a 6 yard electric shovel, operated by purchased electric power from Wheeling, West Va., a dozen miles away. G-E Motors and Control equipment are used exclusively.

The economy and certainty of power resulting have permitted uninterrupted operation through the coldest weather.

Two electrical equipments for 8 yard shovels have been sold as a result of the splendid satisfaction given by the 6 yard shovel. These shovels are operated by one man and are both roomy and clean, thus promoting safety of operator.

General Electric Company

Athens, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio.

Cleveland, Ohio.
Columbus, Ohio.
Dayton, Ohio.
Denver, Colo.
Des Moines, Iowa
Duluth, Minn.
Elmira, N. Y.
Erie, Pa.
Fort Wayne, Ind.
Hartford, Conn.
Indianapolis, Ind.

General Office: Schenectady, N. Y.

ADDRESS NEAREST OFFICE

Jacksonville, Fla.
Joplin, Mo.
Kansas City, Mo.
Knoxville, Tenn.
Los Angeles, Cal.



Louisville, Ky.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Nashville, Tenn.

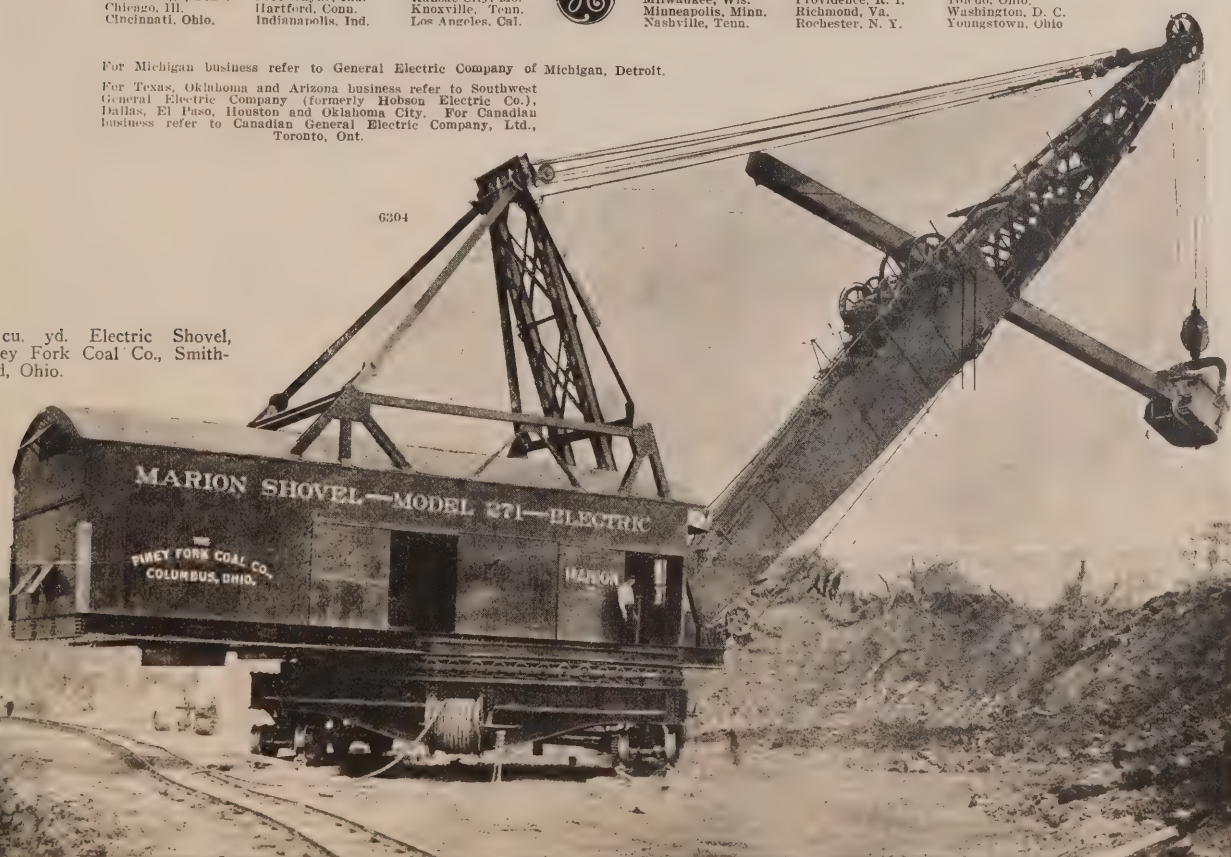
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Niagara Falls, N. Y.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
Richmond, Va.
Rochester, N. Y.

St. Louis, Mo.
Salt Lake City, Utah.
San Francisco, Cal.
Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio.
Washington, D. C.
Youngstown, Ohio.

For Michigan business refer to General Electric Company of Michigan, Detroit.

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.

6 cu. yd. Electric Shovel,
Piney Fork Coal Co., Smith-
field, Ohio.





WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face Page No. 28.

Photograph showing

~~Picture~~
COPY

Taken at Calumet Sag Canal, May 20th, 1916.





WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face Page No. 29.

Photograph showing

Marion Stearns Shovel, Model No. 211

Loading Cars for Pipe.

Taken at Calumet Sag Canal, May 20th, 1916.



keep two such shovels operating. This equipment could only be used where the top of surface of ground was approximately parallel to the rock bench on which the shovel operates.

Drilling.

The drilling was done by two Ingersoll Wagon Drills, drilling 25 holes 19 ft. deep, per 10 hours, each being 3 ft. below grade. The holes were 3" in diameter and about 5 ft. centre to centre. Each hole was loaded with about 25 lbs. of 60% dynamite and no springing was done. At least two rows of unloaded drill holes were lost, each shut from fractures due to the blast. The material appeared to be shot up to average conditions. It would appear that improvement could be made by spacing the holes considerably farther apart and "springing" the holes.

Channeling.

The channeling was done by two Ingersoll-Rand No. 6 Machines and one EW.71, Sullivan Channeling. The Foreman says that the Sullivan Machine cuts almost twice what the other does and averages 200 sq. ft. of channeling per day of 10 hrs. cutting 16 ft. deep.

Labor Employed.

The labor employed for the whole excavation appeared to be as follows:

Steam Shovel - 2 Shifts.

2 Operators \$175.00 per month

2 Foremen 75.00 " "

4 Trackmen .25¢ per hr.

2 Coal Passers .25¢ " "

Tipple - 2 Shifts. Same as Shovel.

2 Foremen for Shovel and Tipple \$4.00 per day each.

Drilling - 2 Shifts.

2 - Operators for each wagon 40¢ per hour.

2 - Helpers " " " 30¢ " "

Powdermen 10 to 12 per shift 25¢ " "

1 Foreman 35¢ " "

Channeling - 2 Shifts.

For the 2 Ingersoll Machines 4 Operators 40¢ per hr.

4 Helpers 25¢ " "

2 Firemen 30¢ " "

2 Foremen 40¢ " "

For Sullivan Machine - 2 Shifts.

2 Operators 40¢ per hour.

6 Helpers 25¢ " "

2 Firemen 30¢ " "

1 Foreman 40¢ " "

Miscellaneous for 2 Shifts.

2 Blacksmiths at 45¢ per hour.

2 Helpers " 25¢ " "

REPAIRS - 2 SHIFTS

1 Operator	2.00
2 Helpers	1.50
1 Foreman	4.00
1 Coal Passer	1.00

Time - 1 Shift, Work on Machine

1 Foreman for Machine and Rigging for the same.

Machine - 1 Shift

1 - Operators for each engine 60¢ per hour

" " " " " " 30¢

2 - Helpers

Powdermen in 20 lb. per hour

1 Foreman

Machine - 2 Shifts

For the 2 Operators Machine 2 Operators for 200 hrs.

4 Helpers 20¢

2 Foreman 20¢

2 Foreman 40¢

For Sullivan Machine - 2 Shifts

2 Operators 40¢ per hour

6 Helpers 20¢

2 Foreman 20¢

1 Foreman 40¢

Machine for 1 Shift

2 Operators at 40¢ per hour

2 Helpers 20¢

PROBABLE COST:

The following would appear to be a close approximation to the cost of excavation:

Int. Depreciation & Repairs on Steam Shovel 20% of \$20,000 for 250 days	\$16.00 per day
Ditto. on Tipple 50% of \$25,000 over 250 days	50.00 " "
Ditto. for three Channellers 25% of \$15,000 for 250 days	15.00 " "
Int. Depreciation & Repairs on 2 Wagon Drills, 25% on \$2000 for 250 days	2.00 " "
Int. & Depreciation on Temporary Rail Lags, 50% of \$1000 for 250 days	2.00 " "
Office Administration	30.00 " "
Coal, Water, Oil, Waste &c., for all machines, 2 shifts,	50.00 " "
TOTAL FIXED CHARGES	\$165.00 " "

Labor.Shovel - 2 Shifts.

2 Operators - \$175.00 per month	14.00 per day
2 Firemen 75.00 " "	6.00 " "
2 Coal Passers .25¢ per hour	5.00 " "
4 Trackmen .25¢ " "	10.00 " "
<u>Tipple - 2 Shifts.</u>	35.00 per day
Foreman for combined shovel and tipple	8.00 " "

THE FOLLOWING WOULD BE A GOOD INVESTMENT FOR THE YEAR 1973

ENCLOSURE

NO ONE LEAVES HERE NO STRANGER & NOT APPROVED

10 1. 20.01

1944

COPIES

[illegible][illegible]

12962

1970-1971

00.2 00.27

[illegible]

00.01

38.00 per day

..... siggls and siggls

Drilling - 2 Shifts.

4 - Operators at 40¢ per hour \$ 16.00 per day.

4 - Firemen at 30¢ per hour 12.00 " "

Blasting - 1 Shift.

12 Laborers at 25¢ per hour 30.00 per day.

1 Foreman at 35¢ per hour 3.50 " "

Channeling - 2 Shifts.

6 Channellers at 40¢ per hour 24.00 per day.

14 Helpers " 25¢ " " 35.00 " "

4 Foremen " 40¢ " " 16.00 " "

2 Blacksmiths " 45¢ " " 9.00 " "

2 Helpers " 25¢ " " 5.00 " "

TOTAL \$393.50

Add 15% 59.00

TOTAL \$452.50

Output 1000 cu. yds. for 2 shifts = 45¢ per cu. yd.

Add powder and fuses = 25¢ " " "

Total = 70¢ " " "

Contract price for this work was 91-6/10¢. which is equivalent to 70¢ for rock excavation, and 24¢ per sq. ft. for channeling.

SECTION 11. - CONTRACTOR J. O. HEYWORTH.

The next piece of work visited was the canal excavation contracted to J. O. Heyworth. The excavation was being made by a Bucyrus Class 175 B.

1911

Exhibit - 2

2 - Expenses at City and District Office \$ 14.00 per day
4 - Expenses at City and District Office 12.00 " "

Exhibit - 3

12 - Expenses at City and District Office 30.00 per day
2 - Expenses at City and District Office 8.00 " "

Exhibit - 4

4 - Expenses at City and District Office 24.00 per day
12 - Expenses at City and District Office 36.00 " "

4 - Expenses at City and District Office 18.00 " "
1 - Expenses at City and District Office 1.00 " "

COPY

1 - Expenses at City and District Office 1.00 " "
Total 100.00

add 10% 10.00

TOTAL \$110.00

Output 1000 cu. yds. for 2 shifts = 400 per cu. yd.

add powder and fumes = 200 " "

Total 600 " "

Estimated price for this work is \$110.00

The work is estimated to be completed in 10 days

Exhibit 11 - Estimated Price for Work

The work is estimated to be completed in 10 days

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20.

Drag Line Excavator, electrically operated. The material handled at the time of the visit was blasted limestone, part of which was used for rip-rap paving and the surplus piled along the canal. The length of the boom was 125 ft. and the working radius at existing angle was 128 ft. It was equipped with a $3\frac{1}{2}$ cu. yd. Bucyrus bucket and the output was an average of 500 cu. yds. per day of 10 hours. The main motor was 250 h.p. using three-phase, 60-cycle, alternating current at 440 volts, which was transformed from 2300 volts through portable transformer moved along the excavator.

The swinging motor was 150 h.p. using the same current, and the compressor motor was 3 h.p.

The average power consumption in glacial drift was .59 K.W.H. per cu. yd. with an output of 36,000 cu. yds. per month of 26 ten-hour days, and .68 K.W.H. per cu. yd., with an output of 30,700 cu. yds., 25% of which was rock.

Power Consumption:

| | |
|------------------------|--|
| <u>Class of Work</u> | - Clay and Gravel. |
| <u>Location</u> | - Blue Island, Ill. |
| <u>Current</u> | - 440 volts, 3-phase, 60 cycle. |
| <u>Maximum Peak</u> | - 300 K.W. to 350 K.W. |
| <u>Average Load</u> | - 160 K.W. to 178 K.W. |
| <u>Time of 1 Cycle</u> | - 47 to 66 seconds for 360° swing. |
| <u>Corresponds to</u> | - - 2.16 K.W.H. to 3.12 K.W.H.
per cycle. |

K.W.H. per Yard - 0.62 to 0.89

Size bucket - $3\frac{1}{2}$ yd.

The general data on the above machine is herewith given:

motor was 8 h.p.

The average price for the 100,000 units was \$1.45 per unit. The average price for the 100,000 units was \$1.45 per unit. The average price for the 100,000 units was \$1.45 per unit.

Location - Five Islands, Ill.
Time of day - Day and Night

The general rule on the above question is: Yes

| Month | Yardage | Max. Demand on
30 Min. basis KW. | K.W.H. | KWH per Yd. | Connected
Load |
|--------------|---------|-------------------------------------|--------|-------------|-------------------------|
| Sept. & Oct. | 43450 | 181 | 27,268 | .627 | 1-175B Dragline |
| 1914 Nov. | 75059 | 207 | 66,660 | .887 | 2-35 H.P. Cent
Pumps |
| Dec. | 61037 | 181 | 55,352 | .875 | |
| 1915 Jan. | 31935 | 173 | 44,424 | 1.392 | |
| Feb. | 1312 | 207 | 15,994 | 12.19 | |
| March | 87532 | 235 | 65,086 | .744 | Add 70C Shovel |

* Record of no value. Current used for pumping.

March & Nov. - Good output. Dragline work finished before the end of March which kept the record from being 100,000 yards. 70-C added.

No definite readings were obtained when digging all in rock. The cost of power was given at an average of 1.1¢ per K.W.H.

COPY

Drilling.

Drilling was done by five to six 3½" Tripod Drills, using compressed air. Each drill averages 150 linear feet per 10 hours. Air pressure of the compressor was 100 lbs. per square inch. The average distance between the compressor and the drilling was about 500 ft. The holes were drilled 22' deep for a 19' bench and spaced 6 to 7 ft. centre to centre. No springing was done. About 1-1/5 lbs. of powder was used per cubic yard removed. 40% dynamite was used.

The compressor was an Ingersoll-Rand cross-compound machine, with a capacity of 880 cu. ft. of free air per minute, operated electrically.

PROBABLE COST.

The following would be a fair approximation as to the cost of the

| Month | Income | Exp. (Inc. on
the 1st of the month) | Net Income | Balance |
|----------|--------|--|------------|---------|
| Jan. 1st | 100.00 | 10.00 | 90.00 | 90.00 |
| Feb. 1st | 100.00 | 10.00 | 90.00 | 180.00 |
| Mar. 1st | 100.00 | 10.00 | 90.00 | 270.00 |
| Apr. 1st | 100.00 | 10.00 | 90.00 | 360.00 |
| May 1st | 100.00 | 10.00 | 90.00 | 450.00 |
| Jun. 1st | 100.00 | 10.00 | 90.00 | 540.00 |
| Jul. 1st | 100.00 | 10.00 | 90.00 | 630.00 |
| Aug. 1st | 100.00 | 10.00 | 90.00 | 720.00 |
| Sep. 1st | 100.00 | 10.00 | 90.00 | 810.00 |
| Oct. 1st | 100.00 | 10.00 | 90.00 | 900.00 |
| Nov. 1st | 100.00 | 10.00 | 90.00 | 990.00 |
| Dec. 1st | 100.00 | 10.00 | 90.00 | 1080.00 |

The balance of the account as of the 31st of the month is \$1080.00. The total income for the year is \$1200.00. The total expenses for the year are \$120.00. The net income for the year is \$1080.00.

The balance of the account as of the 31st of the month is \$1080.00. The total income for the year is \$1200.00. The total expenses for the year are \$120.00. The net income for the year is \$1080.00.

of goods was given as an example of the way to do it.

COPY

William

The following is a list of the goods which were sold during the year. The total value of the goods sold is \$1200.00.

The following is a list of the goods which were sold during the year. The total value of the goods sold is \$1200.00.

The following is a list of the goods which were sold during the year. The total value of the goods sold is \$1200.00.

The following is a list of the goods which were sold during the year. The total value of the goods sold is \$1200.00.

The following is a list of the goods which were sold during the year. The total value of the goods sold is \$1200.00.

The following is a list of the goods which were sold during the year. The total value of the goods sold is \$1200.00.

dynamic was used.

The experiment was in fact a very simple one. It was a

series of tests in which the air was blown through a

THE END

The following is a list of the goods which were sold during the year. The total value of the goods sold is \$1200.00.

excavation:

Interest, Depreciation & Repairs on Dragline 20% of
\$25,000 over 250 days \$ 20.00 per day.

Interest, Depreciation & Repairs on seven Drills,
100% of \$2000 for 250 8.00 " "

Interest, Depreciation & Repairs on Compressor Plant,
15% on \$5000 for 250 days 3.00 " "

Interest & Depreciation on temporary buildings, 50%
of \$1000 for 250 days 2.00 " "

Preparatory charges and removal of plant \$2500 over
500 days 5.00 " "

Office and Administration 30.00 " "

Oil, Waste &c. 1.00 " "

TOTAL FIXED CHARGES \$ 69.00 " "

Labor.Dragline - 2 Shifts.

2 Operators at \$175.00 per month \$ 14.00 per day.

2 Oilers, and 75.00 " " 6.00 " "

4 Trackmen .25 per hour 10.00 " "

Drilling - 1 Shift.

12 Drillers and Helpers averaged 30¢ per hour - \$36.00 per day.

Foreman 40¢ per hour. 4.00 " "

Powderman - 1 Shift.

6 men at 25¢ per hour \$ 15.00 per day

1 Foreman 35¢ " " 3.50 " "

REVISIONS

| | |
|---------------------------------------|------|
| Interest, 3 months at 3% on \$1000.00 | 3.00 |
| Interest, 3 months at 3% on \$200.00 | 1.80 |
| Interest, 3 months at 3% on \$100.00 | .90 |
| Interest, 3 months at 3% on \$50.00 | .45 |
| Interest, 3 months at 3% on \$25.00 | .23 |
| Interest, 3 months at 3% on \$12.50 | .11 |
| Interest, 3 months at 3% on \$6.25 | .06 |
| Interest, 3 months at 3% on \$3.13 | .03 |
| Interest, 3 months at 3% on \$1.56 | .01 |
| Interest, 3 months at 3% on \$.78 | .01 |
| Interest, 3 months at 3% on \$.39 | .01 |
| Interest, 3 months at 3% on \$.20 | .01 |
| Interest, 3 months at 3% on \$.10 | .01 |
| Interest, 3 months at 3% on \$.05 | .01 |
| Interest, 3 months at 3% on \$.02 | .01 |
| Interest, 3 months at 3% on \$.01 | .01 |
| Interest, 3 months at 3% on \$.00 | .00 |

COPY

REMARKS

| | |
|-------------------------|------|
| 1. Interest - 3 months | 3.00 |
| 2. Interest - 3 months | 1.80 |
| 3. Interest - 3 months | .90 |
| 4. Interest - 3 months | .45 |
| 5. Interest - 3 months | .23 |
| 6. Interest - 3 months | .11 |
| 7. Interest - 3 months | .06 |
| 8. Interest - 3 months | .03 |
| 9. Interest - 3 months | .01 |
| 10. Interest - 3 months | .01 |
| 11. Interest - 3 months | .01 |
| 12. Interest - 3 months | .01 |
| 13. Interest - 3 months | .01 |
| 14. Interest - 3 months | .01 |
| 15. Interest - 3 months | .01 |
| 16. Interest - 3 months | .01 |
| 17. Interest - 3 months | .01 |
| 18. Interest - 3 months | .01 |
| 19. Interest - 3 months | .01 |
| 20. Interest - 3 months | .01 |
| 21. Interest - 3 months | .01 |
| 22. Interest - 3 months | .01 |
| 23. Interest - 3 months | .01 |
| 24. Interest - 3 months | .01 |
| 25. Interest - 3 months | .01 |
| 26. Interest - 3 months | .01 |
| 27. Interest - 3 months | .01 |
| 28. Interest - 3 months | .01 |
| 29. Interest - 3 months | .01 |
| 30. Interest - 3 months | .01 |

Paving - 1 Shift.

15 men at 25¢ per hour \$ 37.50 per day.

1 Foreman 35¢ per hour 3.50 " "

Blacksmith & Helper 75¢ per hour 7.50 " "

Revolving Shovel Model No. 251. with revolving drum containing 1000 cu. yd. of material.

Operator - 1 shift 5.00 " "

1 Pumpman, 30¢ per hour 3.00 " "

TOTAL \$214.00

Add 15% 32.00

TOTAL \$246.00

Less Paving charges 41.00

15%

6.00

Portion of overhead 5.00 52.00

BALANCE \$194.00

Output for 24 hours 1000 cu. yds. equivalent to 19.4¢ per cu. yd.

Electric Energy, including air 1-6/10¢ - 1-6/10 " " "

Dynamite and Fuses 25¢ " " "

TOTAL 46¢

We were advised that Mr. Heyworth states that he gets rock out at one-third less by using electric power than by steam, which checks our cost as deduced from Byrne Bros. work, which we found to be 70¢.- Deducting one-third, 23-1/3¢ leaves a balance of 46-2/3¢.

Contract price of Mr. Heyworth's work was 65¢ per cu. yd.

1011

1917 - 1918

| | | | |
|----------|----------|----------|----------|
| 1.000000 | 1.000000 | 1.000000 | 1.000000 |
| 1.000000 | 1.000000 | 1.000000 | 1.000000 |
| 1.000000 | 1.000000 | 1.000000 | 1.000000 |

| | | | |
|----------|----------|----------|----------|
| 1.000000 | 1.000000 | 1.000000 | 1.000000 |
| 1.000000 | 1.000000 | 1.000000 | 1.000000 |

TOTAL 1.000000

1.000000

1.000000

COPY

1.000000

1.000000

1.000000

1.000000

1.000000

TOTAL 1.000000

1.000000

1.000000

1.000000

1.000000

1.000000

SECTION NO. 9. - BYRNE BROS. CONTRACTORS.

The next section was No. 9, under contract to Byrne Bros.- A "Marion" Revolving Shovel Model No. 251, was removing earth excavation from a cut 25 to 30' deep, and 75' wide at the top, and loading into four-cubic yard cars. The size of the dipper was 2½ cu. yds. The train service consisted of small locomotives handling 5 cars each. This method of disposal was only temporary. Under ordinary conditions a tippie was used, similar to the other contract of Byrne Bros. in Section No. , but on account of the dump from the tippie interfering with the road crossing, a temporary disposal had to be made.

The Superintendent advises us that in the previous month their estimate was 70,000 cu. yds. of material by one of these outfits, of which 10,000 cu. yds were rock. This was taken out by working three 8-hour shifts.

No reliable cost could be obtained here on account of the temporary work being in progress.

Remarks

See- tion of Contractor of Rock per C.Y. Drift of Drift per C.Y. Channeling C.Y. Rock C.Y. Drift Cost per Rock including Cost per C.Y. Rock C.Y. Drift

| | | | | | | | | | | | |
|-----|--|---------|------|----------|--------------------|---------|-------------------|-------------------|---|-------------------|----------------|
| 1. | J.O. Keyworth,
Chicago | 315,000 | 0.71 | 265,000 | 0.50 | 270,000 | 0.33 | 1.00 ⁷ | Also had 55,000 cu. yd. drift at Kys. at 30¢ pr. y. | 0.16 ⁵ | Guthrie & Sons |
| 2. | Winston Bros.,
Minneapolis | 253,000 | 0.65 | 221,000 | 0.22 | 313,000 | 0.20 | 0.67 ³ | | | |
| 3. | S.A.H. Robinson
Contr. Co.,
St. Louis | 220,000 | 0.69 | 335,000 | 0.29 | 102,500 | 0.25 | 0.96 ⁵ | | | |
| 4. | Forschner & Sexton,
Mt. Vernon, N.Y. | 121,000 | 0.77 | 760,000 | 0.25 | 0 | 0 | 0.77 ³ | No channeling | | |
| 5. | Green & Sons Co.,
Chicago | 141,000 | 0.70 | 1070,000 | 0.24 | 0 | 0 | 0.70 ³ | do. | 0.04 ⁵ | |
| 6. | " | | | | | | | | | | |
| 7. | " | 15,000 | 1.90 | 2350,000 | 0.42 ⁵ | 0 | 0 | 1.90 | No channeling, small yardages of rock. | | |
| 8. | " | | | | | | | | | | |
| 9. | Byrne Bros. Dredg.
& Eng. Co.,
Chicago | 50,000 | 1.25 | 875,000 | 0.28 ⁷⁵ | 0 | 0 | 1.25 | do. | | |
| 10. | Shuble & Quim,
Chicago | 500,000 | 0.69 | 670,000 | 0.32 ⁶ | 0 | 0 | 0.69 | No channeling | | |
| 11. | J.O. Keyworth,
Chicago | 65,000 | 0.65 | 750,000 | 0.29 ² | 0 | 0 | 0.65 | do. | 0.46 | |
| 12. | Byrne Bros. Dredg.
& Eng. Co.,
Chicago | 125,000 | 0.70 | 455,000 | 0.25 ⁵ | 100,000 | 0.28 ⁵ | 0.95 ⁶ | | 0.70 | |

COPY

Contracts 5 Dredging Elect. in rock.
" " " " "
" 11 " " " " "
Contracts 12 "Marion" Shovel steam, in rock.
Guthrie "Marion" 300 in earth.

1921

COPIES OF THE BOOKS OF THE UNIVERSITY OF CHICAGO PRESS
AND OF THE UNIVERSITY OF CHICAGO PRESS

COPY

COMPRESSORS, DRILLS & BIT SHARPENERS

Sullivan Machinery Co.

Compressors:

On May 23rd, with Mr. O'Rourke and Mr. Boice, of the Sullivan Machinery Co. an inspection was made of their plant in Chicago, and we also made a visit to see one of their latest type compressors with a capacity of 2500 cu. ft. of free air per minute. This machine is very compact and takes a small floor space for setting, and when driven electrically the motor is placed between the high and the low pressure sides, thereby economizing space.

COPY

Jack Hammers:

A test was made of a Sullivan Jack Hammer of their largest and latest type, which will drill a 12 ft. hole in average limestone. Test was made on a small piece of Indiana Limestone, which was the only material available, and in this piece of rock the rate of actual drilling was 9" per minute. The air pressure of the compressor was 93 lbs. per sq. in., with about 50 to 75 ft. of 1" pipe, and one length of 50 ft. 1" hose to the drill.

Three types of drill bits were used, but no appreciable difference in the rate was seen in drilling the 9".

Bit Sharpeners.

Also made test of mechanical bit sharpeners which were operated by compressed air. This machine could put on a shank on a 1" Hex. steel bit in ten

seconds and would also make a bit true to gauge in the same time. It would appear that this machine would be very efficient equipment, particularly when the amount of drilling was of sufficient amount to warrant its purchase.

GOODMAN ELECTRIC LOCO. WORKS

In the afternoon of the same day a visit was made to the Goodman Electric Locomotive Works, but the largest locomotive which they manufacture was 25 tons. Data regarding the quantities and length of haul in connection with our Niagara Development, was left with their representative, Mr. Farnham.

COPY

GANTRY CRANES AND GRAB BUCKETS - ILLINOIS STEEL COMPANY

On May 24th, with Mr. Hoover of Hoover & Mason, and Mr. O'Rourke of the Sullivan Machinery Co., an inspection was made of the work of six Ore Unloaders, and two large Bridge Gantry Cranes in the plant of the Illinois Steel Co. of South Chicago. Each unloader has a bucket capacity of six tons and unloaded a 12,000 ton boat-load of ore in about seven hours, which is equivalent to 2000 tons of ore for each unloader in seven hours, including cleaning up.

Each large Bridge Gantry has a capacity of 15 tons in 1½ minutes and transfers about 200 ft. These are all electrically operated with direct current with Cutler-Hammer control and Westinghouse motors.

The whole design of travellers and grab buckets is made by Hoover & Mason, and these machines have been operating for about ten years.

records and would also make a full list of names in the same line. It would appear that this machine would be very efficient equipment, particularly when the amount of drilling was of sufficient amount to warrant the purchase.

THESE MACHINES ARE USED

In the afternoon of the same day a visit was made to the Goodman Electric Machine Co., and the largest machine was seen. This machine was of the type which is used for drilling and boring of holes in metal. It is a very large machine and is used for drilling and boring of holes in metal. It is a very large machine and is used for drilling and boring of holes in metal.

COPY

THESE MACHINES ARE USED

On May 1st, 1917, with Mr. Hoover of Hoover & Ineson, and Mr. O'Rourke of the William Wadsworth Co., an inspection was made of the work of the six Dr. Philander and two large Dr. Philander machines at the plant of the William Wadsworth Co. The Dr. Philander has a brook capacity of six tons and unloaded a 12,000 lb. load of ore. It is a very large machine and is used for drilling and boring of holes in metal. It is a very large machine and is used for drilling and boring of holes in metal. It is a very large machine and is used for drilling and boring of holes in metal.

It is a question in this connection however, whether this bucket will dig successfully in rock excavation.

Arrangements are being made to visit Rochester, N.Y. and see the nature of the material which was removed from the barge canal work by one of these Hoover & Mason Grab Buckets. Mr. Hoover is now making a study of our conditions and will make his recommendations and submit an approximate price for one machine.

Supplementary to the above information regarding the Hoover & Mason Grab bucket.

Mar 30, 1906

Mr. F. F. Williams, Division Engineer of New York State, Barge Canal, Rochester, has kindly furnished the following information regarding the output of the large Gantry Crane Grab Bucket which was used on contract #6. The size of the bucket was 8 cubic yards and was made especially for purposes of rock excavation.

Excavation by dynamite. Work done by hand.

July 31, 1906.

Started July 5, 1906. Would pick up only two or three yards and 45 trips per hour. See photo. 5343-B)

August 31, 1906.

39 shifts of 8 hours; 3555 yds. of earth; 22686 yds. of rock, making larger bucket.

Excavation by dynamite

September 30, 1906.

42 shifts of 8 hours; laid up 8 shifts; 4250 yds. of earth; 19932 yds. of rock.

October 31, 1906.

New bucket. Shut down 16 to 25. 37 shifts, 22721 yds.

November 30, 1906.

21 shifts; 5413 yds. of earth; 9428 yds. of rock.

December 31, 1906.

Work Dec. 1st to 13th. Dynamo car burned. Tying up work for Jan. & Feb.

March 31, 1907. ^{100 8-hour shifts} Shovel and 10-yd. bucket substituted for grab bucket. (See photo. 5401).

October 31, 1907.

Worked full width and 14-ft. depth. New bucket to be installed. (See photo. 5419). Day and night shifts; 16 hours delay repairs.

Beginning November 1, 1907.

New bucket. Break in bucket Jan. 17, 1908. Stopped work for balance of month. Resumed work Feb. 22nd. Trolley car destroyed by fire March 24th. Resumed April 15th, 1908.

June 30, 1908.

Cut through Lee Road. Rock still soft and 2 to 1 slopes to be continued.

September 30, 1908.

Delay at Falls Branch.

The following is a description of work included in estimate, which does not include any work done before November 1, 1908. In October 1908 conveyor started on a centre cut for drainage from Sta. 2600 + 75, working east; leaving a bench on each side on which channeling machines began work. The conveyor cleaned up top lift ahead of frills and excavated centre cut to grade. (See photo. 5581). Worked east to 2590 + 50, and about June 2, 1909, began to move back, making light cut down to Channel line. June 25th conveyor reached Sta. 2644 + 50 and began working east again, taking out full width to grade and slope. The latter were dressed by hand. The material was mostly rock.

The time given includes numerous small delays and time spent cleaning up in front of drills and cleaning up bottom to complete the work. Work was practically complete in August 1911, the east end of contract being Sta. 2571. (See photo. 8113).

Excavation by shovel and train outfit and shovel and tippie incline between above stations before conveyor entered was about 476000 cu. yds. largely earth. Excavation by conveyor November 1, 1908, to August 1911, 444000 cu. yds., making a total excavation of 921000 cu. yds.

| Month | No. 8-hour shifts | Month | No. 8-hour shifts |
|--------------|-------------------|--------------|-------------------|
| January 1909 | 49 | July 1910 | 52 |
| February | 36 | August | 41 |
| March | 42 | September | 51 |
| April | 45 | October | 40 |
| May | 51 | November | 35 |
| June | 51 | December | 35 |
| July | 54 | January 1911 | 40 |
| August | 45 | February | 42 |
| September | 47 | March | 35 |
| October | 33 | April | 22 |
| November | 38 | May | 26 |
| December | 10 | June | 20 |

| <u>Month</u> | <u>No. 8-hour shifts</u> | <u>Month</u> | <u>No. 8-hour shifts</u> |
|--------------|--------------------------|-----------------------|--------------------------|
| January 1910 | 25 | July 1911 (Continued) | 20 |
| February | 15 | August | 5 |
| March | 27 | | |
| April | 22 | November 1908 | 46 |
| May | 22 | December | 38 |
| June | 31 | | |

Total number 8-hour shifts, November 1908 to August 1911 is 1192.

From the above statement it would appear that the output of this equipment does not exceed 370 cubic yards of rock per 8 hour shift, which does not seem very satisfactory considering the cost of the equipment which is given at \$105,000.

COPY

PORTABLE COMPRESSORS - ZIN-HO COMPRESSOR CO.

An inspection was made of a Zin-Ho Portable Compressor of a capacity of 140 cu. ft. of free air per minute. This equipment seems to be an assembly of an automobile, four-cylinder gasoline engine and an air-cooled Gardner Compressor, which is made in Quincy, Ill.

The machine seen was being used for rivetting work on bridge repairs over the Chicago River. This gasoline motor could be substituted by an electric motor and perhaps serve the purpose for drilling in isolated locations.

ELECTRIC SHOVELS AND LOCOMOTIVES.

BUCKEYE COMPANY.

On the 25th of May, accompanied with Mr. Beck of the Canadian Equipment Co.,

1918

| Month | Amount | Month | Amount |
|-----------|--------|-----------|--------|
| January | 12 | January | 12 |
| February | 15 | February | 15 |
| March | 17 | March | 17 |
| April | 22 | April | 22 |
| May | 25 | May | 25 |
| June | 28 | June | 28 |
| July | 31 | July | 31 |
| August | 34 | August | 34 |
| September | 37 | September | 37 |
| October | 40 | October | 40 |
| November | 43 | November | 43 |
| December | 46 | December | 46 |

Total amount for 1918 is \$1,000.00

From the above statement it will be seen that the amount of \$1,000.00

has been expended for the purpose of the above mentioned work.

Very respectfully, your obedient servant, W. I. Frank & Co.

W. I. Frank & Co.

COPY

W. I. Frank & Co.

W. I. Frank & Co.

The following is a list of the work done during the year 1918:

1. The amount of \$1,000.00 was expended for the purpose of the above mentioned work.

2. The amount of \$1,000.00 was expended for the purpose of the above mentioned work.

3. The amount of \$1,000.00 was expended for the purpose of the above mentioned work.

4. The amount of \$1,000.00 was expended for the purpose of the above mentioned work.

5. The amount of \$1,000.00 was expended for the purpose of the above mentioned work.

6. The amount of \$1,000.00 was expended for the purpose of the above mentioned work.

W. I. Frank & Co.

W. I. Frank & Co.

On the 15th of 1918, the amount of \$1,000.00 was expended for the purpose of the above mentioned work.



COPY

THE NEW YORK PUBLIC LIBRARY
ASTOR LENOX TILDEN FOUNDATION
500 MADISON AVENUE
NEW YORK, N. Y.

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face Page No. 45

No. 5419

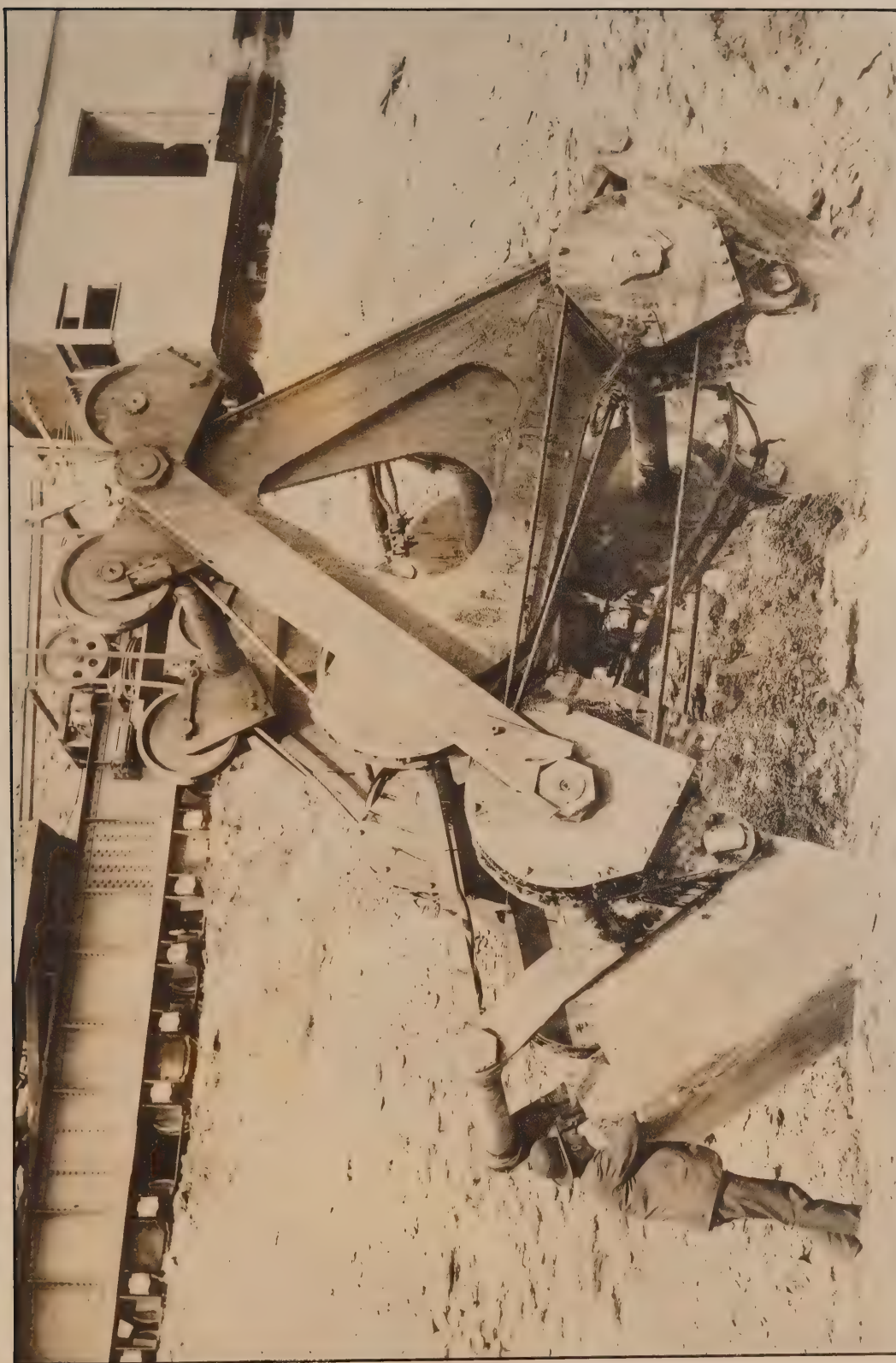
Photograph showing

COPY

Hoover & Mason Crab Bucket

New York State Barge Canal

Taken April 29th, 1907.



COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face Page No. 46

No. 5401

Photograph showing

COPY

Excavating with shovel and skids

New York State Barge Canal.

Taken March 29th, 1907.



COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 47.

No. 5757

Photograph showing

COPY

Excavation at Fall Branch Crossing.

looking east.

New York State Barge Canal.

Taken October 2nd, 1908.



COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allen Ross.
To face page No. 48.

No. 5655

Photograph showing

COPY

Excavation with New Bucket, Contract No. 6.

New York State Barge Canal.

Taken June 5th, 1908.







COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 49.

No. 8113

Photograph showing

COPY
Cleaning up Bottom at East End of Contract

New York State Barge Canal.

Taken June 19th, 1911.



COPY

REPRODUCTION OF THE ORIGINAL

REPRODUCED FROM THE ORIGINAL

REPRODUCED FROM THE ORIGINAL

REPRODUCED FROM THE ORIGINAL

No. 6591

Photograph showing

COPY

Excavation where Sides were Channelled.

Centre Cut made with this Machine.

New York State Barge Canal.

Taken August 19th, 1909.



COPY

THE UNIVERSITY OF CHICAGO
LIBRARY
1207 EAST 58TH STREET
CHICAGO, ILL. 60637

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 51.

No. 6729

Photograph showing

COPY

Trimming Slopes with Steam Shovels West of Falls Branch

New York State Barge Canal

Taken November 10th, 1909.



an inspection was made of the Bucyrus Electric Shovel, Model 70 C., which is being installed at a quarry near Rockwood, Mich., between Toledo and Detroit. At the time of our visit the machine had not reached its final location and arrangements were made to see it on a later date when it would be working against rock face.

On June 22nd, we returned to Rockwood and saw this shovel in operation. This shovel was originally owned by J. C. Heyworth, contractor on the Calumet Sag work, and was sold to the quarry company at Rockwood. It is equipped with a $2\frac{1}{2}$ cu. yd. dipper and the power is generated by the quarry company and is supplied to the shovel as three-phase, 60-cycle alternating current at 440 volts. It appears that when working on the Calumet Sag work, two coils of the motor had been burned out, in consequence of which the ratio of the gearing has been reduced in order to lighten the current consumption, and a small motor-driven air blower has also been installed to keep the motor cool. It was claimed that the motor became over-heated on account of working the shovel continuously for three 8-hour shifts against hard rock excavation.

DRILLING.

The spacing of the drill holes for this work was 15 to 16' centre to centre and the material excavated is a soft silicious rock which breaks up quite readily. Drilling was done by well drills, the depth of holes being approximately 15 to 20 ft.

an inspection was made of the Hughes Electric Shovel, Model 70 2.5, which is
being installed in a quarry near Denver, Colorado, and it was found that
at the time of our visit the machine had not reached its final location and
arrangements were made to see it on a later date when it would be working against
rock faces.

On June 22nd, we returned to Rockwood and saw this shovel in operation.
This shovel was originally made by the Hughes Electric Shovel Co. of
New York and was sold to the quarry company at Denver. It is powered
by a 25 hp. motor and the power is transmitted to the shovel through a
reducer to the shovel as three-phase, 60-cycle alternating current at 440
volts. It operates at a speed of 100 ft. per min. and the weight of the
bucket is 1000 lbs. The bucket is 4 ft. wide and 2 ft. deep. It
has been reduced in order to lighten the current consumption, and a small
motor-driven air blower has been added to keep the motor cool. It
was claimed that the motor became over-heated on account of working the shovel
continuously for long periods of time.

CONCLUSIONS

The spacing of the drill holes for this work was 18 in. center to
center and the material examined is a soft limestone with some sandstone
lenses. The drilling was done with a 1 1/2 in. diameter bit and the
approximately 15 to 20 ft.

STANDARD PAPER CO. COMPANY
COPY THE MATERIALS FOR THE
ON THE 19th 1914



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 53.

Photograph showing

COPY

Eucyrus Electric Shovel, Model 700

near Rockwood, Mich.





COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 54.

Photograph showing

COPY

Bucyrus Electric Shovel, Model 700

at Rockwood Quarry, Mich.

Taken June 22nd, 1916.





COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 55.

Photograph showing

COPY

Bucyrus Electric Shovel, Model 70C

Digging in Rockwood Quarry, Mich.

Taken June 22nd, 1916.





COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 56.

Photograph showing

COPY

Bucyrus Electric Shovel, Model 70C

Digging in Rockwood Quarry, Mich.

Taken June 22nd, 1916.





COPY



Photograph showing

Removal of No. 3 Thew Revolving Steam
Shovel from Rockwood Quarry, Mich.

COPY

Photograph showing

Boom and Dipper Stick of Model 700

Bucyrus Electric Shovel

Quarry near Rockwood, Mich.



WALTER J. BARNETT & COMPANY
COPY FOR ENCLOSURE TO Mr. J. Allen Ross.
To face page No. 58.



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 58.

Photograph showing

COPY

Formation of Rock Excavation Being Made

by Bucyrus Model 700 Electric Shovel

Taken at Silica Quarry near Rockwood, Mich.



OUTPUT.

The output of this shovel is now 500 tons in ten hours with only one car operating. Designs are now being completed for a new plant of 1000 tons in ten hours to be supplied by this shovel.

Appended hereto is a statement showing the consumption and nature of the cycle for the 70 C. electric shovel working at Calumet Bag work.

BUCHNUS

Mach. No. 1886 Size 70C Type Electric

Unit POWER CONSUMPTION **COPY** Refer to TEST DATA TAKEN June 23-1915.

| Test No. | K.W. | Seconds | K.W.H. | K.W.H. | REMARKS |
|-----------|---------------|--------------------|------------|-----------|---|
| Curve No. | Av. of Cycle. | Duration of Cycle. | per Cycle. | per Yard. | |
| 1 W | 127.0 | 28 | | | During this test dipper was not dropped back for a second scraping. |
| | 104.0 | 25.5 | | | |
| | 96.5 | 23.0 | | | |
| | 132.0 115.4 | 26.5 25.7 | .825 | .47 | |
| 2 W | 155.0 | 33 | | | |
| | 135.0 | 33 | | | |
| | 124.0 136.0 | 30 32.0 | 1.209 | .69 | |
| 3 W | 140.0 | 42.5 | | | |
| | 140.2 140.1 | 29.0 35.7 | 1.392 | .796 | |
| 4 W | 121.5 | 36 | | | |
| | 115.2 | 38 | | | |
| | 124.3 | 42 | | | |
| | 108.0 117.2 | 47 40.7 | 1.32 | .754 | |
| Average | 127.2 | 33.5 | 1.167 | .677 | |

$$\frac{115.4 \times 25.7}{3600} = .825 \text{ K.W.H. per cycle. } 2\frac{1}{2} \text{ Yd. Dipper} = 1\frac{1}{2} \text{ Yd. per cycle.}$$

$$\frac{.825}{1.75} = .47 \text{ K.W.H. per Yd.}$$

CURVE - Main Circuit
 BUCHNUS ELECTRIC SHOVEL
 No. 1886. Size 70C
 (59)

Drawing No. 34648
 Date - July 12th 1915

1992

Specs for the VC 3. electric shovel mounted at Belmont Bay town.
Agreement made is a statement showing the ownership and control of the
ten hours to be supplied by this shovel.

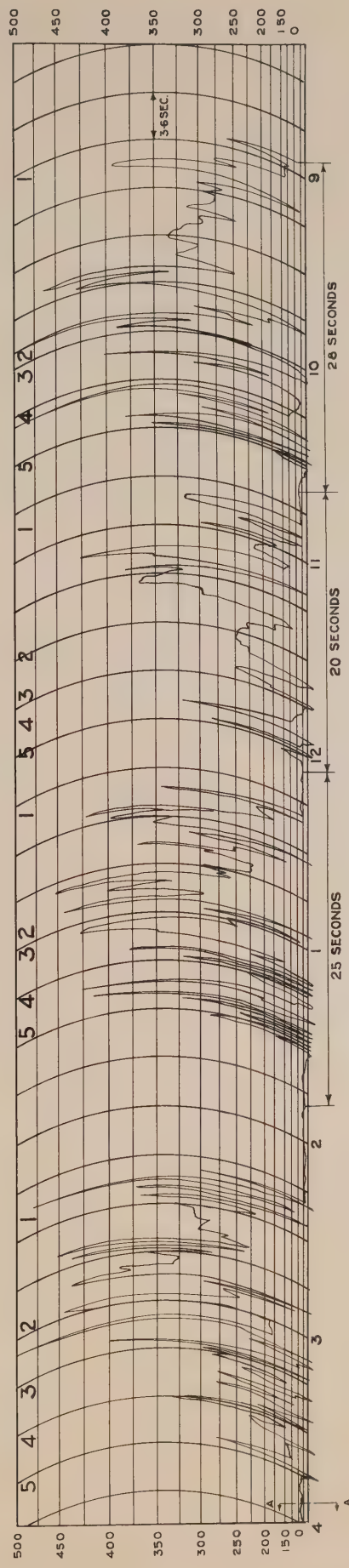
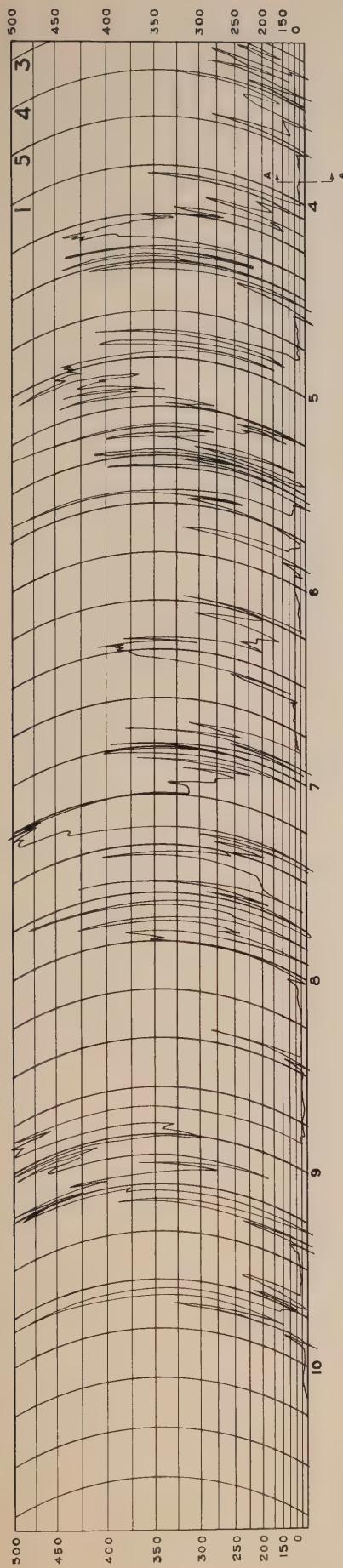
232

1400. Nov. 1888 Size 700 Type Electric

THIS DOCUMENT CONTAINS NEITHER RECOMMENDATIONS NOR
CONCLUSIONS OF THE NATIONAL BUREAU OF STANDARDS
AND SHOULD NOT BE USED TO SUPPORT OR OPPOSE ANY
SPECIFIC PRODUCT, TO PROMOTE OR LAMENT THE ADVANCEMENT
OF ANY TECHNOLOGY, OR TO ENDORSE OR REJECT ANY
SPECIFIC THEORY, METHOD, OR PRODUCT.

| Curve No. | Av. of Cycle. | Deviation of Cycle. | Secants | Av. of Cycle. | Deviation of Cycle. | Secants |
|-----------|---------------|---------------------|---------|---------------|---------------------|---------|
| 1 W | 127.0 | 28 | 127.0 | 28 | 127.0 | 28 |
| | 104.0 | 28.5 | 104.0 | 28.5 | 104.0 | 28.5 |
| | 82.0 | 28.0 | 82.0 | 28.0 | 82.0 | 28.0 |
| | 127.0 | 28.0 | 127.0 | 28.0 | 127.0 | 28.0 |
| 2 W | 128.0 | 30 | 128.0 | 30 | 128.0 | 30 |
| | 128.0 | 30 | 128.0 | 30 | 128.0 | 30 |
| | 124.0 | 30.0 | 124.0 | 30.0 | 124.0 | 30.0 |
| | 127.0 | 30.0 | 127.0 | 30.0 | 127.0 | 30.0 |
| 3 W | 127.0 | 28.5 | 127.0 | 28.5 | 127.0 | 28.5 |
| | 120.0 | 28.0 | 120.0 | 28.0 | 120.0 | 28.0 |
| | 127.0 | 28.0 | 127.0 | 28.0 | 127.0 | 28.0 |
| | 127.0 | 28.0 | 127.0 | 28.0 | 127.0 | 28.0 |
| 4 W | 127.0 | 28.0 | 127.0 | 28.0 | 127.0 | 28.0 |
| | 127.0 | 28.0 | 127.0 | 28.0 | 127.0 | 28.0 |
| | 127.0 | 28.0 | 127.0 | 28.0 | 127.0 | 28.0 |
| | 127.0 | 28.0 | 127.0 | 28.0 | 127.0 | 28.0 |

$$\text{BY } \text{M.W.E. } \text{Vt.} = \frac{320}{37.1}$$



NOTE

Curve taken simultaneously with Wattmeter Curve No 1W.
Speed of Paper 1"=4.8 seconds
Refer to Drawing No 34648

LEGEND REFERRING TO NUMBERS SHOWN THUS: 4

- 1- Begins Digging
- 2- Hoist over Bank
- 3- Swing Out
- 4- Hoist and dump over Skip
- 5- Return Swing

AMPERE CURVE- MAIN CIRCUIT BUCYRUS ELECTRIC SHOVEL No 1-1886 SIZE 70 c. GRAPHIC AMMETER CURVE No 1A

Traced from Manufacturer's blueprint
Walter J. Francis & Company,
Toronto, 1923

70 C. ELECTRIC

Location - Blue Island, Ill.

Current - 440 volts, 3-phase, 60-cycle.

Average Load - 115 during one cycle.

Time of Cycle - 25.7 sec.

Corresponds to - .825 K.W.H. per cycle.

K.W.H. per Yard - 47

Note: In extreme digging where considerable scraping of the bank was necessary, the K.W.H. per yard varied from .69 to .70 making an average of .67 K.W.H. per yard in glacial drift containing cemented gravel.

COPY

Attached see ampere curve, shown on blue print 34648, of main circuit on this shovel, also a section of a K.W. curve of the main circuit taken simultaneously with the ampere curve.

This machine is equipped with 165 H.P. hoist motor, 90 H.P. thrust motor and 75 H.P. swing motor.

ELECTRIC SHOVEL - "MARION" SHOVEL CO.

ELECTRIC LOCOMOTIVES - JEFFREY MANUFACTURING CO.

On June 9th, accompanied with Mr. Osborne of F. H. Hopkins & Co., we made an inspection of the work being done by the Empire Limestone Co. in their quarry near Pekin, N.Y. This company is quarrying and crushing limestone for fluxing purposes and the thickness of suitable stone varies from 8 to 12'. This entails considerable stripping, in many cases, being equal to the depth of the rock quarry. The presence of clay seams also increases the cost of

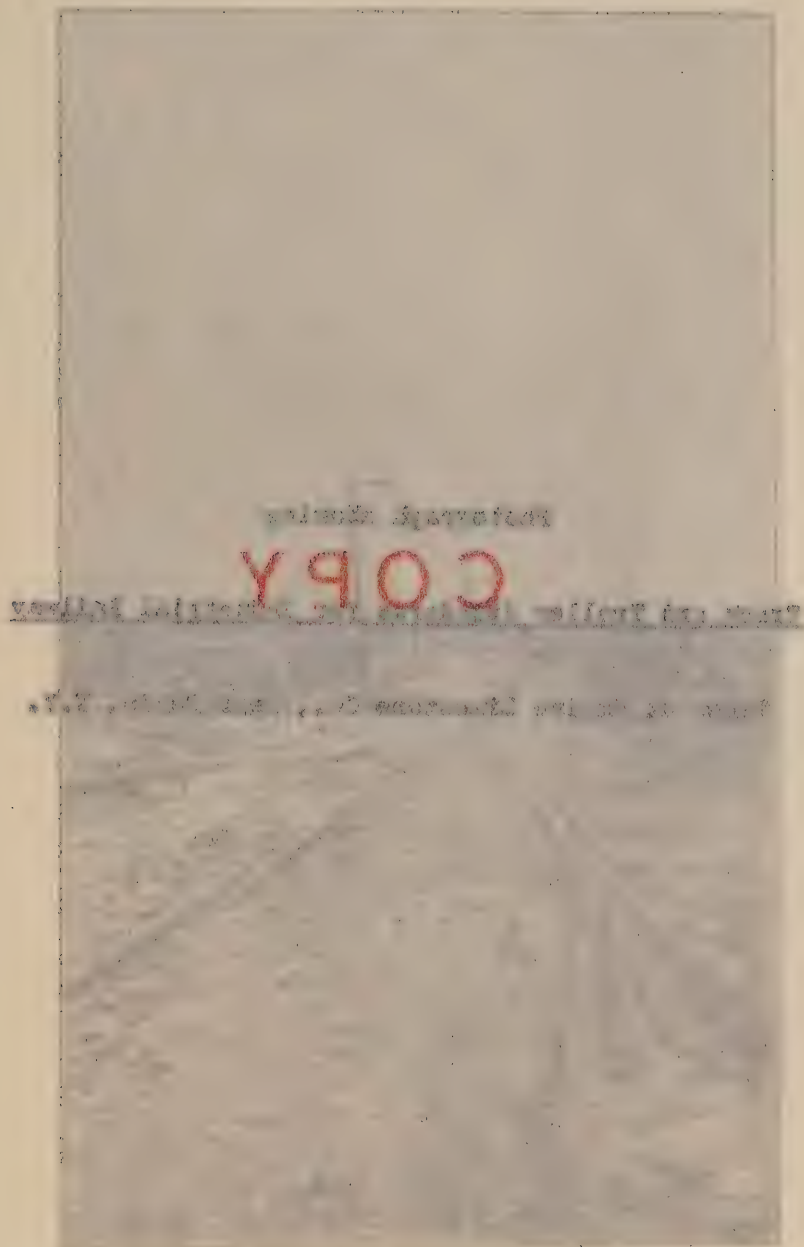
quarrying. Where these seams occur, the rock has to be loaded by hand to avoid clay being mixed with it.

Equipment.

The stripping and some excavation in rock is done by two Model No. 91, and Model No. 51, "Marion" Electric Shovels. The product is handled to the crusher by six electric 17-ton locomotives made by the Jeffrey Manufacturing Co., Columbus, O. One locomotive seems well able to haul 6 to 8 six-yard loaded cars up a 2% grade. The length of the haul is about one mile.

The shovels and locomotives are operated by direct current at 550 volts. Model No. 91 is equipped with 3 $\frac{1}{2}$ cu. yd. dipper and is operated by two 75 h.p. Bullock Railway Type Motors and one 75 h.p. for swinging, and one 7 h.p. for compressor, all at 550 volts. The protection against heavy current is secured by Cutler-Hammer control.

The output, where other operations of hand loading are in progress, is about 500 cu. yds. per 10 hours. Where the shovel can load without other work interfering, the output is 1400 cu. yds. per 10 hrs. There appears to be no motor trouble except re-winding armatures in approximately five-year periods on account of insulation breaking down. This shovel has been in service seven years. The average consumption of power for the whole plant of crushing and excavation is 836 h.p. This operates two Model 91 shovels, one No. 51 shovel, six 17-ton locomotives, all by direct current, and two compressors each of 1200 cu. ft. capacity,— One 150 h.p. motor for crushing, one 50 h.p., one 40 h.p. three 25 h.p. three 10 h.p. and the lighting system, all of which consume



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 64.

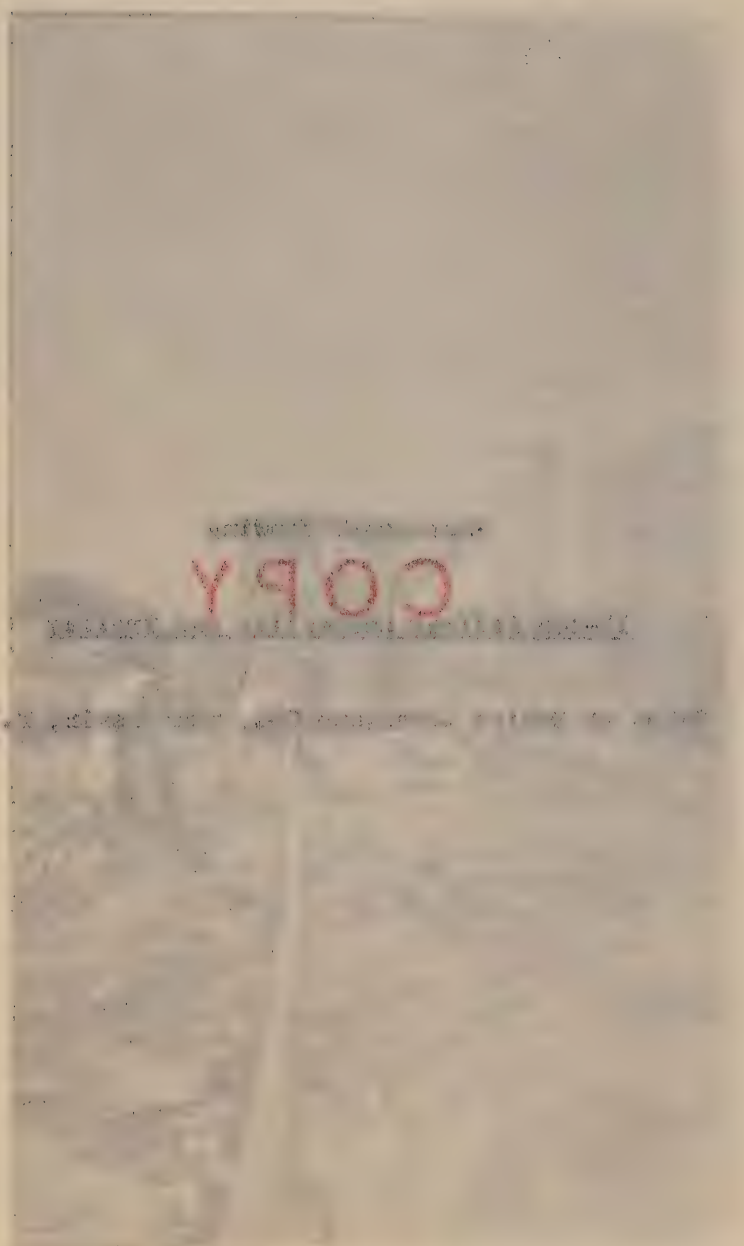
Photograph showing

COPY

Track and Trolley Standards for Industrial Railway

Taken at Empire Limestone Co., near Pekin, N.Y.





WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 65.

Photograph showing

COPY

17-ton Jeffrey Locomotive and Trolley

Taken at Empire Limestone Co., near Pekin, N.Y.



WALTER J. FERGUSON & COMPANY
CHIEF AND MANAGER OF THE
MR. J. ALLEN ROSS.
The House of Representatives



COPY



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 66.

Photograph showing

Marion Electric Shovel, Model No. 91,
and 17-ton Jeffray Electric Locomotive

Empire Limestone Co., near Pekin, N.Y.

COPY

Marion Electric Shovel, Model No. 91,

in Limestone Rock Excavation

Empire Limestone Co., near Pekin, N.Y.



WALTER J. FRANK & COMPANY
COPY AND BINDING IN - 12 - 1/2 ALIAS BOOKS FOR 63.

COPY

FRANK J. FRANK & COMPANY

2.00 ALIAS BOOKS FOR 63.

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 67.

Photograph showing

COPY

Nature of Rock Excavation:

Marion Electric Shovel, Model No. 91

Taken at Empire Limestone Co., near Pekin, N.Y.



alternating current. This company transforms its own power which is supplied by the Ontario Power Co.

The average K.W.H. consumption of Model 51 in earth excavation is .35 K.W.H. per cycle, and assuming $1\frac{1}{2}$ cu. yds. of earth per cycle, this becomes .233 K.W.H. per cu. yd. The average current consumption for 10 hrs. is 52.7 amps.

In the afternoon of May 24th, the work

TRACK: Initial studies have shown that the

The trolley standards are pressed steel made by the United States Metal Co. and are set in socket castings secured to 14' ties spaced 60' on tangents.

COPY

The standards are 8' 4" from the outside rail, which gives about 2' clearance to the trolley wire from the side of the 6 yd. cars. The track is standard gauge.

DRILLING:

Jack Hammers of the Sullivan type are replacing all tripod drills and are giving very satisfactory service, each hammer drilling more than a $2\frac{1}{2}$ " tripod drill. These machines will drill 12' holes at less than half the cost of tripod drill, being operated by one man, and at less air consumption. Holes are spaced 8 to 10 ft. and are loaded with 60% dynamite without springing, the rock being too seamy for springing.

No item cost could be secured as the process included considerable loading of cars by contract and stripping and crushing were so intimately mixed with excavation, that the results would be of little value in connection with our

...the following ...
...the ...
...the ...
...the ...

The ...
...the ...

COPY

...the ...
...the ...
...the ...
...the ...
...the ...
...the ...

...the ...
...the ...
...the ...

1 contract was awarded in 1975 and the other was

On June 22nd, the writer called again at the United States Lake Survey Office in Detroit in connection with the Livingstone Channel excavation. Col. Patrick had in the meantime been transferred. Through the courtesy of Major Burgess who succeeded Col. Patrick, the following data was secured regarding the costs and the work of cutting the Livingstone Channel.

The original contract price was \$1.24 per cu. yd. which included

Library. It was located by our staff some 10 to 15 miles

•

1. The defendant, JAMES EARL RAY, is a white male, born [redacted] at [redacted] Mississippi. He is currently residing at [redacted] Memphis, Tennessee. He is a member of the [redacted] and has been active in the [redacted] since [redacted].

1900

On June 1941, the writer called again at the United States Navy
Office in Detroit in connection with the following matters, and
detached him in the morning from the office. The writer was
instructed to proceed to the office, the following day and report regarding
the status of the case in relation to the following matters.

[illegible]

channeling, and \$75,000 of coffer dam work. \$25,000 was spent on the coffer dam by the United States in addition. This price covered the channel 5600 ft. by 300 ft. wide. The price for widening was \$1.10 per cu. yd., the original coffer dam being sufficient for both works.

The contract was started in 1908 and the work was completed in 1911.

The material encountered was limestone, very similar in formation to the Niagara limestone. It was removed by three steam shovels loading into skips, which were handled by three travelling cable-ways. The excavated material was dumped along the cut 50 ft. back from the channel sides. The work is believed to have cost 85¢ per cu. yd. including all charges. The following is the distribution of the cost: **COPY**

| | |
|--|-------|
| Coffer Dam and removal (ends removed only) | 8.7% |
| Pumping | 10 % |
| Channeling, including air | 3 % |
| Drilling " " | 15.2% |
| Blasting | 17.5% |
| Excavation, including depreciation, &c. | 22.6% |
| Conveying and disposal of material | 16.5% |
| General Expenses | 6.5% |
| | 100% |

Assuming 85¢ as the total cost and deducting 15% as a charge against coffer dam and pumping, the cost of excavation under similar conditions to our work, would be about 72½¢ per cu. yd.

The original contract for the 1500 ft. of channel at the North end was to provide for a depth of 22 feet, but after this was sub-let to the Grant-Smith Company, it was decided to cut this down to 23 feet.

The following statement indicates the cost and yardage of rock involved in this work:

| ITEM | 23' Deep | | 23' - 24' | | Below 24' | Total |
|------------------|----------|----------------|-----------|-------------|-----------|---------------|
| | C.Y. | Cost | C.Y. | Cost | C.Y. | Cu. Yards |
| Lengthening | | | | | | |
| 1500' x 300' | | | | | | |
| at N. End | 5547 | 1.24 | 680 | 0.62 | 135 0 | 6362 |
| Main contract | | | | | | |
| 4100 x 300' | 675209 | 1.24 | 30355 | 0.62 | 5338 0 | 711902 |
| | 680756 | 1.24 | 844137.44 | 51035 | 0.62 | 19241.70 |
| | | | | | 6473 0 | 0 |
| Widening | | | | | | |
| 5600 x 150' | | | | | | |
| W. Side | 469608 | 1.10 | 20356 | 0.55 | 3705 0 | 493369 |
| Extra | | | | | | |
| Work Deepen- | | | | | | |
| ing from | | | | | | |
| 22-23' N.end. | 183 | 1.10 | 15954. | 0.55 | 7 0 | 16144 |
| | 469791 | 1.10 | 516770.10 | 36010 | 0.55 | 19805.50 |
| | | | | | 3712 | 1227777 |
| | | | | | | |
| | | \$1,360,907.54 | | \$39,047.20 | | \$1,399,954.7 |
| Min. To. Drilled | | | Drilled. | Per Cu. Yd. | | \$1.14 av. |

SHOVEL RECORD.

| | | | |
|-------------------------|-----------------------------|-----------------|-----------------|
| Shovel 1161 Main Contr. | Hrs. Wkd. 3074 | Hrs. Delay 1222 | Output 147689 E |
| | | | 6686 E |
| | % 70 | % 30 | |
| | C.Y. Output per hour worked | 50 ² | |
| Shovel 1187 Main Contr. | Hrs. Wkd. 5847 | Hrs. Delay 1709 | Output 322142 R |
| | % 78 | % 22 | |
| | C.Y. Output per hour worked | 55 ¹ | |

SHOVEL RECORD - Continued

Shovel 1463 Main Contr. Hrs. Wkd. 6286 Hrs. Delay 1575 Output 222730 R.
144107 E.

Machine hours worked % 80 % 20
C.Y. Output per hour worked 58⁴

3 Shovels Widening Hrs. Wkd. 10199 Hrs. Delay 2255 Output 515805 R.
70819 E.

% 82 % 18
C.Y. Output per hour worked 57⁵

1 Shovel N. End. Hrs. Wkd. 4032 Hrs. Delay 1496 Output 187613

% 73 % 27
C.Y. Output per hour worked 46⁵

Summary of Drilling

| | Main | Widening | N. End. |
|----------------------------|--------|--------------------|----------------|
| Drill hours worked | 68606 | - | 16597 |
| Hours delay | 8875 | Drilled
5.1 ft. | 2165 |
| % Time worked | 88.5 | of hole | 88.6 |
| % Delays | 11.5 | per drill | 11.4 |
| No. of holes drilled | 66553 | per hour | 25369 |
| Lin. ft. drilled | 405649 | 1.84 Dyn. | 107226 |
| 60% dynamite used | 315908 | per lin. | 98400 |
| 40% dynamite used | 272275 | ft. | 92800 |
| Total Dynamite per cu. yd. | .583# | drilled. | .687# |
| 40% - - - | .500# | | .650# Av. |
| Total Dynamite per cu. yd. | 1.083# | 1.35# | 1.337 Av. 1.26 |
| Cu. yd. per ft. drilled | 1.33 | 1.53 | 1.33 1.33 |

Holes spaced 8' x 6'. No springing.

SUMMARY OF CHANNELING

| | <u>Main</u> | <u>Widening</u> | <u>N. End</u> | <u>Av.</u> |
|--|-------------|-----------------|---------------|------------|
| Machine hours worked | 10995 | | 2130 | |
| - - delay | 4439 | | 430 | |
| - worked % | 71.2 | | 83.3 | |
| - delay % | 28.8 | | 16.7 | |
| Sq. ft. Channelled | 132690 | | 26980 | |
| Sq. ft. Channelled
per machine hour | 12.1 | 14.5 | 12.7 | 13.1 |

LEVEE WORK NEAR HILLHOUSE, MISSISSIPPI.

COPY

On June 19th, accompanied by Mr. Spencer Miller, Chief Engineer, the Lidgerwood Mfg. Co., and Mr. Dryer of the Canadian Allis-Chalmers Co., an inspection was made of the work of widening and raising the levee on the East side of the Mississippi River near Hillhouse. This work is being done by a levee commission by day labor forces under the direction of Major Blattery, United States Survey. The equipment consists of a high speed cable-way operating a 4 cu.yd. Page Drag Bucket. The Cable-way is a Lidgerwood-Crawford and the first of its kind. With one or two comparatively slight changes it would appear to be a most efficient machine.

The span is approximately 625 ft. and at the time of the visit the maximum cycle took $1\frac{1}{2}$ minutes. The rate of excavation was materially affected by the air compressor capacity, which did not supply sufficient air for digging and braking purposes. A duplex compressor has been ordered which no doubt will help to add considerably to the output.

WATER J. FRANKS & COMPANY
1001 N. BROADWAY, N. Y. 10
TO THE NEW YORK

COPY

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

DATE 10-10-01 BY 60322 UCBAW/STP

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.
To face page No. 74.

Photograph showing

COPY

Tail Tower, High Speed Lickwood Cableway Drag Line

Building Levee, Mississippi River near Hillhouse, Miss.





WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 75.

Photograph showing

Nature of Excavation **COPY** Also Speed

Lidgerwood Cableway Drag Line.

Levee, Mississippi River near Hillhouse, Miss.



Waring & Thomas & Company
Printed and Published by Mr. J. Allan Ross.
No. 1000 Broadway N.Y.C.



COPY

Reproduction of the original drawing, 1890.

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 75.

Photograph showing

Head Tower, Head Street, Millhouse

Cableway Drag Line

Building Levee, Mississippi River near Millhouse, Miss.





WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 77.

Photograph showing

COPY

4 Cubic Yard Cable Drag Bucket. High

Speed Lidgerwood Cableway Drag Line

Levee, Mississippi River near Millhouse, Miss.



SHOWING

RANGE

(78)

DRAG-LINE EXCAVATORS

When the first machine was put into commission, the cycle took one minute, the air compressor then working more efficiently. The rate of output at that time was about 1400 cu. yds. in 10 hours. At the time of our visit, it was about 500 cu. yds. in 10 hours, measurement being made in the levee embankment, after deducting 25% for settlement. The speed of travel is 1500 ft. per minute under normal conditions, and the hoisting speed about 400 ft. per minute.

From actual cost sheets which were freely placed at our disposal, we find that the day labor cost for 10 hrs. is \$51.00, and material \$13.00. Total direct charge \$64.00 for 10 hrs., which is about 13 to 14¢ per yard. To this should be added 3 to 4¢ for administration and office charges, and 20% for interest and depreciation, distributed over 300 days, is equivalent to 3 to 4¢ per cu. yd. The cost of the machine ready for operation was about \$45,000.

The coal is charged to Cable-way at \$3.20 per ton and it uses on an average of three tons per 10 hrs.

A new track moving device is being provided which will cut out one shift of track men, amounting to nine laborers and a foreman. At present, track is moved on the tail tower by derrick and the head tower by tackle, dragging the track under the tower.

SUMMARY OF LEVEE COST.

Direct labour and material 13 - 14¢ per c.y. levee measurement.

Administration and office 3 - 4 " " " "

Int. and Depreciation, 20%
over 300 days 3 - 4 " " " "

19 - 22¢ per c.y. levee measurement.

[illegible]

and it is not clear to whom

A new crane mounted on a trailer is being used to move the large pieces of equipment from the old building to the new one. It is expected that the new building will be completed by the end of the year.

© 1994 by the American Psychological Association 0893-3200/94/1103-0000\$05.00/0

... ..

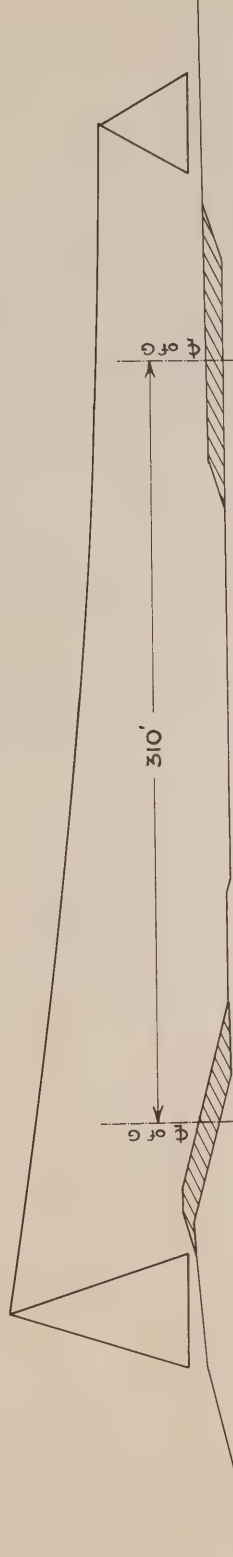
Int. and Depreciation, 20%

Is - 254 per 0.7. For no moment.

DIAGRAM SHOWING OPERATING RANGE OF DRAG-LINE EXCAVATORS



LIDGERWOOD DRAG-LINE EXCAVATOR
AT HILLHOUSE, MISS.



BUCYRUS DRAG-LINE EXCAVATOR
AT LEOTA, MISS.

Traced from print
Walter J. Francis & Company
Toronto, 1923.

preparing sketches of METHODS ON THE CHICAGO DRAINAGE CANAL.

Attached hereto is a publication by the Lidgerwood Co. on contractors' methods on the Chicago Drainage Canal. It is of interest in this connection in that the rock formation is very similar, and the sides of the cut are channelled. However, most of these methods of handling rock are perhaps best adapted to excavating and spoiling along the canal and would not apply so readily to the Niagara work, where the rock is disposed of at a distance which requires transportation by train. Some of the devices also depend a great deal on the surface being parallel to the cuts in the canal and the canal being of sufficient width to suit the special equipment. The cable-ways in this case, required a large number of laborers who loaded the skips by hand. At the time this work was in progress the price of labor was exceptionally low and plentiful, the price being 15¢ per hour.

A cable-way would no doubt be worthy of consideration in handling a grab bucket and making up our river section where the excavated material could be hoisted along the canal similarly to the work of levee building on the Mississippi.

ROCK CONVEYOR

On May 26th, took up the question of Rock Conveyor for excavation in canal cut, with Jeffrey Mfg. Co. at Columbus. This is the proposition as shown on Blue Print B-10-2-3-L attached hereto. They advise that there is no particular difficulty utilizing this method of handling excavation and are now

REMARKS ON THE PROPOSED TREATY

It should be noted that the Commission
on the Chicago Treaty Council. It is of interest in this connection to
note that the Commission is very similar, and the aims of the two are identical.
However, most of these matters of detail which are perhaps best adapted to
economic and political aims. The Council and the Commission are working in the
direction of, where the work is directed at a distance which requires trans-
mission by mail. Some of the matters also require a great deal of the matter
being handled in the case in the Council and the Commission are working in the
same direction. The Council is in the Commission is in the same direction. The
number of members are limited in the Council. In the case of the Council
however the number of members are unlimited. The Council is in the Commission is in the same direction.

being 184 per hour.

A table of results is given in the report of the Commission in the case of the
Council and the Commission. The results of the Council and the Commission are given
in the report of the Council and the Commission. The results of the Council and the Commission are given

results.

THE COUNCIL

In the case of the Council, the results of the Council and the Commission are given
in the report of the Council and the Commission. The results of the Council and the Commission are given
in the report of the Council and the Commission. The results of the Council and the Commission are given
in the report of the Council and the Commission. The results of the Council and the Commission are given

preparing sketches and will send their recommendations. They were supplied with data covering the approximate yardage and the time limit for completing the excavation.

ALLIS-CHALMERS PLANT.

On May 19th, Messrs. White, Chief Engineer, and Dryer, of the Allis-Chalmers Co., with Mr. Hogg and the writer, visited the Allis-Chalmers Plant at Milwaukee, where an inspection was made of the equipment and capacity of the plant, which appeared to be of the highest order.

COPY

CHAIN BELT COMPANY.

On the same day, the writer submitted a sketch of Rock Conveyor to the Chain Belt Co. of Milwaukee, which is proposed to handle blasted rock in rock section of canal. (See attached Blue Print).

With this equipment two shovels of $1\frac{1}{2}$ cu. yd. capacity each, load the rock into the lower end of the conveyor, which delivers it into cars on the ground surface. The Company is now making a study as to possibilities and costs, and will submit within a short time.

Blue Print No. B-10-2-3-L, was left with this Company.

WOOD-NORDBERG COMPANY.

On the same day the Nordberg Mfg. Co. plant was visited. The questions

negative character and will not be a recommendation. They were supplied
with data covering the general character and the type and complexity
of the operation.

From the time the machine was first used in the laboratory, it was found
that it was a very simple machine and that it was very easy to use.

On May 18th, 1911, Messrs. White, Chief Engineer, and Taylor, of the Illinois
Machine Co., who had been and who were, visited the Illinois Machine Co.
at Milwaukee, where in connection with some of the equipment and especially at the
plant, which appeared to be at the highest level.

COPY

THIS IS NOT A COPY.

On the same day, the writer mentioned in each of the reports in the
Illinois Machine Co. of Milwaukee, which is given in the Illinois Machine Co. in each
section of each. (See attached New York).

With this equipment and character of it, the machine was, from the
time late the power and of the machine, which appears to be late on the
ground machine. The Company is now under a contract to be manufactured and
used, and will much within a short time.

Five times the 1-11-11-11, and with this language.

THE ILLINOIS MACHINE CO.

For the same and the Illinois Machine Co. and Taylor, the machine

of efficiency and capacity curves of their large 12' screw pumps were taken up with Mr. Nordberg. These curves had been submitted to the Commission by Mr. Wood of the Wood-Nordberg Co. Slight changes were suggested in the design and capacity to meet our requirements more closely.

These pumps are proposed for the purpose of storing surplus Sunday water for distribution over the balance of the week, and also for pumping daily peak requirements in the ultimate development under 300,000 h.p. installation.

Mr. Wood, designer of the 12' Screw Pumps, now in service at New Orleans, has since been here and the whole matter of pumps has been discussed. He is now working on a study of revised curves and will submit his recommendations and curves of head efficiency and power to meet our conditions.

Blue Print No. A-5-10-4-S, was left with Mr. Nordberg.

Inspection was made of the Nordberg Plant, which appears to be well equipped to handle any work of that kind in an efficient manner.

CONSULTATION WITH LIDGERWOOD COMPANY.

On May 22nd, interviewed Mr. Crawford, of the Lidger-wood Co. in Chicago, who suggests a cable-way equipment for our rock excavation in canal cut. He is now preparing sketches showing both dragline and cableway ideas for our work. He also agreed to give us a statement showing power consumption of their draglines to Section No.

Respectfully submitted,

WELL DRILLS.

On July 12th an inspection was made of the plant of the Canada Crushed Stone Company near Dundas, Ontario, where 6-8 Well Drills do all the drilling for the Quarry. The Rock Drill is limestone and is practically the same that would be encountered in the Niagara work. Each of these drills is operated by a 10 h.p. Electric Motor.

The size of the Drill Bit is 4", drilling a hole varying from $4\frac{1}{4}$ " to $4\frac{1}{2}$ " in diameter. Each drill equipment is portable, being mounted on a four wheel truck. This kind of drill has two advantages, i.e. First: That no compressed air plant is needed and Second: The diameter of the holes drilled is such that no "springing" is needed to produce good digging rock.

From records kindly furnished by Mr. Doolittle, one of the owners of the Quarry, it is found that the average daily drilling for each drill is 35 linear feet for 11 hours. The holes are drilled two feet below grade, and for a 17 foot bench or a 19' hole the spacing is about 12' each way.

About 2 lbs. of 40% dynamite is used for each foot of hole drilled. This is equivalent to .42 lbs. per cubic yard of product, and is blasted so that very little "block hole" drilling is necessary.

The cost of drilling should be about as follows:

| | | |
|---|--------|---------|
| Interest depreciation and repairs on one drill at | | |
| 25% - \$1500.00 for 250 days | \$1.50 | per day |
| Rope | 1.00 | " " |
| Administration chargeable for 1 drill | 1.00 | " " |
| Total fixed charges - | \$3.50 | " " |

THE DRILL

On July 15th an inspection was made of the plant of the United States
Copper Company near Butte, Montana, where 5-8 inch drills are used in the drilling
of the country. The plant will be described in a separate report. The work done
will be summarized in the following words. Most of these drills are equipped with
a 10 H.P. Electric Motor.

The size of the hole drilled is 5-8 inch. The depth of the hole is 100 feet
in diameter. Each drill is equipped with a special bit, being made of a hard metal
alloy. This kind of drill has been used in the drilling of the country. The kind of
bit used is made of a hard metal alloy. The bit is used in the drilling of the country.

COPY

When a hole is drilled, it is found that the bit is used in the drilling of the country.
It is found that the bit is used in the drilling of the country. It is found that the bit
is used in the drilling of the country. It is found that the bit is used in the drilling of the country.

There is a lot of work done in the drilling of the country. It is found that the bit
is used in the drilling of the country. It is found that the bit is used in the drilling of the country.

The cost of drilling should be about as follows:

| | |
|---|----------------|
| Interest depreciation and repairs on one drill at | |
| 25¢ - \$1000.00 for 200 days | \$2.50 per day |
| Rope | 1.00 " |
| Electricity (at 10¢ per kWh) | 1.00 " |
| Total fixed charges - | \$4.50 " |

| | | |
|-------------------------------------|-----------------|-----------------|
| Labcr. | Carried forward | \$3.50 per day |
| One operator | | \$4.00 per day |
| Half helper | | 1.50 " " |
| Blacksmith and Helper per one drill | | 1.50 " " |
| Power | | <u>1.50</u> " " |
| | Total | \$12.50 |

For 35 ft. drilled, this equals $34\frac{3}{10}\%$ per foot, or about $7\frac{2}{10}\%$ per cubic yard of product.

COPY

| Particulars | Debit | Credit |
|----------------|--------|--------|
| Balance b/d | | 100.00 |
| By Cash | 50.00 | |
| By Bank | 20.00 | |
| By Debtors | 30.00 | |
| By Creditors | | 10.00 |
| By Balance c/d | | 10.00 |
| Total | 100.00 | 100.00 |

For the purpose of the trial balance, the total of the debit column must be equal to the total of the credit column.

COPY

WILLIAM J. FRANCIS & COMPANY
COPY FOR ENCLOSURE TO Mr. J. Allen Ross.
To Ross page No. 65.



COPY
WILLIAM J. FRANCIS & COMPANY
COPY FOR ENCLOSURE TO Mr. J. Allen Ross.



WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 85.

Photographs showing

Nature of Rock Excavation taken out by

Model No. 91 Marion Steam Shovel

Canada Crushed-Stone Quarry, near Dundas, Ont.



TO THE BOARD OF DIRECTORS



COPY

RECEIVED AT THE OFFICE OF THE SECRETARY OF THE BOARD OF DIRECTORS

ON THE 10TH DAY OF JANUARY, 1900

WILLIAM J. TOLSON



WALTER J. FRANCIS & COMPANY

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 86.

Photographs showing

COPY

Nature of Blasted Rock in Canada

Crushed-Stone Company's Quarry, near

Dundas, Ont.



THE NEW YORK PUBLIC LIBRARY
ASTOR LENOX TILDEN FOUNDATION
170 FIFTH AVENUE, NEW YORK, N. Y.



COPY

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO Mr. J. Allan Ross.

To face page No. 87.

Photograph showing

Model No. 91 Marion Steam Shovel Mining Rock Excavation

Canada Crushed-Stone Co., near Dundas, Ont.



